db

THE SOUND ENGINEERING MAGAZINE

THE ELECTRONIC COTTAGE

Guides: Signal Processing Equipment

Since **1967**

for audio professionals

A Bite of the Big Apple

Circle 10 on Reader Service Card

the recording engineer

the broadcast engineer

the sound contracting engineer

THE ELECTRONIC COTTAGE

See page 18

See page 23

About the Cover

• The cover of this issue features a color shot of Sanctuary's Studio B. (The cover and inside shots of the studio are by photographer Bob Wolsch.) This innovative recording studio, located in lower Manhattan is one of four New York based recording operations which are profiled in *A Bite of the Big Apple* beginning on page 6 and continuing to page 27.

Editorial

As you have already observed before coming to this page, this issue's main thrust is pro audio in New York City. We've called it *A Bite of the Big Apple*, although four stories only scratch the surface of what is going on these days in New York.

We've done some interesting reading on just how New York got to be called "The Big Apple." No one, from the state's Governor to the City's Mayor seem to have the exact same story.

The Governor, Mario Cuomo, says it comes from the 20s and 30s jazz musician's term for making to the top of the tree, using the jazz term "making to the Big Apple."

Others ascribe the term to a tune popular in dance circles in the early thirties.

Mayor Ed Koch agrees that it comes from a jazz term but adds that it came from NYC's Harlem.

Just to muddy the water a bit further, Columbia, South Carolina has been reported in a recent New York newspaper as claiming that "The Big Apple" was a popular dance that originated (where else?) in Columbia in the thirties.

Does it really matter? Perhaps not unless you are a NYC booster (or detractor).

What does matter is that in this issue's *Bite of the Big Apple* we have four stories on New York City-based professional audio operations—**Howard Schwartz Recording**, a major force in post-production work, producer **Fred Zarr** uses technology to make better records for his clients, artist and sound designer **EBN** uses his sophisticated home equipment and beyond to produce film and TV special effects, and finally, **Sanctuary**, a new studio complex from which we also have our cover picture.

Just turn to page 28 for an exclusive first report anywhere on the audio at the Olympics. You see it first in **db Magazine!** LZ

Calendar

- The AES 85th Convention is being held in Los Angeles on November 3rd through the 6th, at the Los Angeles Coliseum. Contact the AES Office at 60 East 42nd Street New York, NY 10165, 212 661-8528.

- Upcoming seminar for SYNERGETIC AUDIO CONCEPTS is:

Anaheim—November 1-2

Upcoming workshops are:

Grounding and Shielding (Los Angeles Area) November 17-19

Concert Sound Reinforcement (Los Angeles Area) January 17-19, 1989

Contact: RR #1, Box 267, Norman, IN 47264, (812) 995-8212.

- EDS '89 (Electronic Distribution Show and Conference), the national forum and marketplace for electronic distribution, will be held at the Las Vegas Hilton Hotel, in Las Vegas, Nevada. Conferences and seminars start on Monday, May 8, and exhibits open on Tuesday, May 9 through Thursday, May 11. The annual event is sponsored by the Electronic Industries Association/Distributor Products Division (EIA/DPD), the National Electronic Distributors Association (NEDA), and the Electronics Representatives Association (ERA).

Information about EDS '89 is available from the Electronic Industry Show Corporation, 222 South Riverside Plaza, Suite 2710, Chicago. IL 60606, (312) 648-1140.

- Pro Audio Asia '89, the international trade exhibition for professionals in the broadcast, recording, public address, installation, contracting, and duplicating industries, will take place from July 6-8 1989 at the Hong Kong Exhibition Centre in Hong Kong.

Letters

Dear Editor,

I am a subscriber to db Magazine. I did not receive the January/February 1988 issue. I am enclosing $3.50 for this issue that must have been lost in the mail. I consider your magazine valuable as I am a producer of records and have a very elaborate home studio for my own enjoyment. Thank you.

Sincerely,

Stephen Schlaks

Monaco

Dear Editor,

This is just a short note to thank you all for including us in db! Coverage like this is a real help for us little guys in the industry. Your magazine has come a long way in the last few years and I really enjoy your present format! Keep up the good work; you're on the right track. Again, let me say thanks!

Yours truly,

Richard Cannata, Cantrax Recorders

P.S. The profile on Studer was great.

Dear Editor,

Just love the articles in db Magazine. They are very informative. Keep up the good work; looking forward to each issue.

Sincerely,
Marvin Stroh
CKCO-TV

Dear Editor,

Thank you again for finding information on some of my vintage equipment, Phase Linear 400, Sansui 5000, Soundcraftsmen EQ and Sound Workshop mixer. (See db, July/August 1988 Hotline.) Long live db Magazine!

Thank you again,
Daniel F. Seashotz
Disco Danny

• Brian Battles, our *Ad Ventures* columnist, has been receiving a tremendous amount of mail! If you have ever wondered who those people are that Brian writes about in his *Talkback Mic*, these are some of the letters that Brian answers in his column in this issue.

Dear Brian,

Enjoyed your last column in Ad Ventures. As another humanoid who developed the 47th chromosome (probably hastened by leaning against a cold water pipe in my basement and operating my Webcor open-reel deck with the metal control knobs simultaneously—an important lesson in grounding), let me suggest that instead of masking tape to mark all the reels in the studio, you use Scotch Mark Brand 256 white paper tape, which accepts most markers and pens, or 3-M's cover up tape #658, which is designed to be a removable for copy block out and type correction work, but makes very easily removable reel-markers and is absolutely write-on-able by any kind of marker.

Sometimes masking tape adheres a little too permanently, especially when left on for more than the intended "temporary" time.

I am continually reminded that life comes full circle. Having started with that Webcor in my basement in my teens, I then worked my way above ground through a college station and many commercial radio station studios, finally building my own pro-

duction studio in Connecticut, which grew into a multi-media production house creating radio, TV, film, video, animation and multi-image productions.

Now I'm back in my basement again with a much more sophisticated studio, only this time I'm serving clients in 18 states and have won over 250 national and regional awards.

Best regards,
Jeffrey P. Hedquist, president
Hedquist Productions Inc.

Dear Brian,

I am a long time reader of Modern Recording & Music and db Magazine and I have enjoyed reading your well-informed, detailed, and well-written articles. Keep the good work up. I have done sound jobs off and on now since 1946 while working for S.W. Bell Tel. Company. I am now retired after 40 years with them. At present, I am running a small home-based sound reinforcement company called "Optimum Sound" now that I am retired. I don't advertise, so, most if not all of my work comes from word of mouth contacts from past customers, bands, etc. At my

stage in life, this is great as I am not overworked, just enough jobs to keep life interesting.

That's enough for the background part. What I am really writing to you concerns your most recent article in the July/August **db Magazine** concerning a versatile audio signal tracer that Allen Schultz designed. It sound as though it would be a handy gadget to have around to use when Murphy's Law takes over and troubleshooting is required. Time is always of the essence when an audience or show is involved. I have a contract with the corps of engrs. to provide sound coverage for two stages adjacent to each other on Sept. 10 at Greer's Ferry, Heber Springs, Arkansas. This is the 19th Annual Program that the Corps have sponsored at the Narrows Park. We usually have several Senators, Congressmen, and other notables—such as Grandpa Jones & Ramona, Gil Gerard, Jo Ann Castle, Bill Cody, Johnny Cash & Roseanne etc. on the program. When you have those kind of people to provide sound for, one works especially hard to provide a trouble-free environment for them.

One of those audio signal tracers would be a great help, if I (Heaven forbid) happen to have some problems. Time is rather short for me to obtain one of the units for my next job, but, if it is possible, I would like to have one as soon as practical.

Thanks for your help in this matter.

Sincerely yours,
Robert Long
Optimum Sound

Dear Brian,

One more note for your tips in July/August 1988 issue...

Tip 4, Figure 2:

Marking the splice this way will also tell you which end of a piece of tape is the beginning. One end will be marked and the other end won't. Nice when it falls on the floor while you're working with a small piece.

Stu Engelke
WZZD-AM, Chief Engineer

Dear Mr. Battles,

A friend of mine recently gave me several copies of **db Magazine** with your column in it. I found it to be extremely informative and inspirational as well.

I have been doing local radio spots for over a year and there have been no really good resources aimed at the small writer/producers until I saw your article in db.

I would sincerely appreciate your letting me know when your cassette on radio advertising production will be available.

I am located in an area where there is rapid growth and I feel that I would truly be able to find enough work to make a part time endeavor. I also have enjoyed this medium having worked with bands and being a music therapist for over seven years.

I will be ordering db as well especially to follow your column.

Sincerely,
Carl Dansky

• To continue with Brian Battles, here are more readers with comments and suggestions, some dealing with

A db bite of the Big Apple

Over a year ago when we did a major article on Howard Schwartz Recording, we thought that was that. But Howard does not stand still, so here are two new rooms.

LARRY ZIDE

● A few months back we sat down with Howard Schwartz at Howard Schwartz Recording in New York City. The complex is located right behind Grand Central Station in a classic building.

We were there because two new rooms have been completed and they are different from the super rooms the complex already has.

Begun as so many others, as a music studio, Howard Schwartz no longer is. Our first question therefore was: "How has the business changed for you?"

"The business has changed totally. It used to be we were a very big music company, where we did a lot of jingles: Budweiser, Kentucky Fried Chicken, Chevrolet, Chrysler Plymouth, Lincoln Mercury, Buick, Miller beer etc., Coca-Cola, Dr. Pepper, Pepsi-Cola, every major account in the world did jingles here at one point in time. Now we have moved into the television business and instead of recording the music, we take the music that is now recorded at other facilities and we synchronize it to the picture, lay up the voices and sound effects and mix it. That's one portion of our business. Another portion of our business is the audio-visual business, corporate video where we basically produce television shows that are not for television, they're for corporate use.

We do television shows as well. Saturday Night Live, all the HBO comedy specials, Cinemax comedy specials, Paul Simon live from Zimbabwe, lots of work for Showtime, the Movie Channel, Nickelodeon, MTV, Lifetime, we do the Robert Klein show, we do all the sweetening and audio post-production for all of those."

THE TWO NEW ROOMS

We wanted now to learn about the two new rooms.

"I'll describe the concepts of the rooms. We built two rooms. This one's a pre-lay and sound design room, where we're putting in a hard disk system (a time code based hard disk system) in conjunction with a Sony BVH 2000 1-inch and a 24-track machine, and a non-automated console, a small voice-over booth, effects generators and Dolby etc. so we can have a TV show come in (or a commercial) and design the sound for it, prior to it going into an SSL room where the cost is much greater."

We then wanted to know if what is done in these rooms can be directly brought into the other rooms.

"Any other room, because of time code. Sound effects, basically, are generated from either a digital format such as a hard disk or a compact disk. There are a lot of them that do not exist on either of those formats, so analog is the way we bump it up to, we lay it out analog."

Figure 1. Demolition time at Howard Schwartz Recording. Raw space after everything is out.

Figure 2. Some of the formers and wiring in the still raw space.

"The rooms are complete, they have all their synchronizers working, by the time this article is printed, a hard disk system will be chosen. We are going with a hard disk system, we just don't know which one it is. There are digital machines in these rooms also. We own several digital machines rather than lease."

"Basically, the genesis of these two rooms is the fact that we had four rooms that were booked all the time. I only engineer when I've got to engineer. That's just overflow business, I generally don't just jump in and engineer. Tomorrow, I'm engineering."

WHY WE HAVE THESE ROOMS

We wanted to then find out where these two new rooms taking them. Howard answered, "These two new rooms are to deal with a different portion of that business which we don't like to waste the big facilities on. There's no reason to have a giant SSL and two digital machines and the one-inchers and all the millions of dollars that we have tied up in our two big rooms for laying in sound effects. We can make it lots less expensive for our clients in a smaller room of this nature where they come in and book a sound day or a bunch of time to do the sound. We will have the ability shortly to even design music for them. They are in effect pre-production rooms."
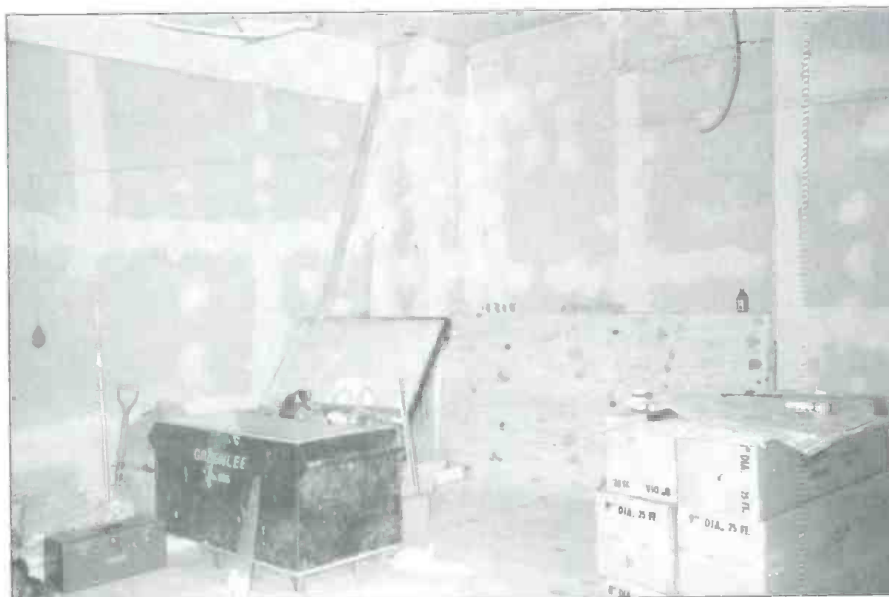
> **We'll do the foley in Studio East, and I do it myself, I mechanically do foley. We have concrete, slate, gravel, wood and carpet and that usually covers most of the bases.**

"They're really two different entities. Studio 7 is almost solely dedicated to one client, that's just the way it worked out. They probably works 6 out of every 8 or 10 hours a day doing promos in Studio 7, which is the mirror image of Studio 8. This room will be primarily for doing sound effects, pre-lays, when a client comes in and has to go through a music library looking for music cuts for an hour-long TV piece, they don't necessarily need to be in a top price room, so we built rooms that can accommodate those needs but without sticking them with the price tag of an SSL and a 24-track dig. They can do all that stuff in here. They can select the music, lay it in, see how it works against the picture."

"This is an accommodation to our clients. What happens is when we're doing a big show, and doing all of the sound effects and the music in one of our big rooms, it takes away from mixing time of other shows that wanted to be in. We've had to turn down the work. So what we've basically done is given other engineers the ability, we've trained other people in sound effects and music production, etc. so that we could pre-lay the sound effects and music for a show so that the mixers can just mix. Then they can work straight through and not have to worry about moving this here and moving that there. Everything will come in movable but in synch with the picture. Instead of having to guess what it will be like sitting at the video edit and having the sound effects guy come in and say 'Yeah, I think I'll put a door slam there.' Bring it over here, we'll put a door slam there and the footsteps there. We can do foley in this room."

DOING FOLEY

Our question then was how will you be doing foley? Will you be doing it mechanically or synthesized?

Figure 3. The sheetrock is finished, but is it a studio yet?

"We'll do the foley in Studio East, and I do it myself, I mechanically do foley. We have concrete, slate, gravel, wood and carpet and that usually covers most of the bases. With digital reverb and effects we're able to place those in any position."

"I have about seven different pairs of shoes to do the foley. Rap Master Ronnie, which will have been on HBO, it's a Garry Trudeau/Ronald Reagan spoof that will have been on the air earlier this year."

"I did all of the foley work on it, all of the footsteps and all of the foley work in it I did. There was a show also on in February called Mondo Beyondo with Bette Midler for HBO. I physically did all the foley for that as well."

A number of studios are now using advanced synthesizer systems to do foley work digitally. But Howard had some other thoughts on that.

"The difference is that it is almost impossible to do it totally on synthesizer. Almost impossible, because it takes too much time. I can do four people walking down a hallway within one pass and have them stop and turn, and you hear their feet move, much faster than you could possibly do it on a synthesizer. That's because I can sit there, the computer in my brain tells me how fast the guys are walking and when they're about to turn. Whereas you can't tell a computer when to hit those footsteps. You can't do it with your hands, either. A second hand can't do the turn, there is a definite sound difference between a turn and a footstep and going upstairs and going downstairs. The sound of going up is much different than the sound going down. A women's shoe is much different than a man's shoe. The squeaks in a gymnasium are much different. It's very, very difficult to create those on a synthesizer. Hopefully, we're going to give it a shot of trying to do it electronically because if we can do it that way, it gives us the ability to do foley in six studios."

Howard continued, "Some machines don't do enough, the foley machines, the digital hard disk-based machines. One machine is too much of a musical instrument, one machine is no musical instrument, one machine doesn't even have the hard disk yet. The three existing kinds of equipment we're looking at are Synclavier, Audiofile and Waveframe. You can say that by the time the article appears, we probably

Figure 4. RPG diffusers are in place, but will their effectiveness be altered by being painted?

will either have made a commitment or seen additional other systems."

EQUIPPING THE ROOMS

Where did the equipment and systems used in these new rooms come from? We posed this question to Howard.

"I designed most of the systems we use here. Most of the way the studio works, or the layouts of these consoles, I truly was involved in the design of them. When the manufacturers, not necessarily this console, but SSL, Sony and MCI, I was very involved in the beginning."

"So there are streaks where you're hot and where you're not hot. Actually, these two rooms did exist in another incarnation. This is the second incarnation of these rooms. Prior to this year, we did three cartoon shows, called Thundercats, Silverhawks and the Comic Strip. We had these two facilities in just offices on the 17th floor of the building where we had two full staffs working these two control rooms where we did all of the sound."

"We've found ways to use the stuff to make money, accommodate our existing clients that were spilling out of the other rooms, we literally didn't have enough hours in the day to accommodate them in the other four rooms. This way, we can take a client who has three weeks worth of work and stick four days of that work in here with a guy doing sound effects for them before they ever get over to Studio East where we get down to the most serious stuff,

the mixing, re-creating ambiences, cross fades, really critical things they can sit in here and choose their sound effects and lay them against picture and see if they work."

WHO IS COMING IN?

We wanted to know what new work was coming into these rooms.

Howard volunteered, "Robert Altman had been here doing a show called Tanner 88. Garry Trudeau, Robert Altman and HBO are running a guy for president. The guy is Michael Murphy and it was a one-hour special on HBO and ran 13 half-hours consequently. It ran during the New Hampshire primaries and was shot in New Hampshire. It's hilarious."

We then wanted to know if there was any tendency for these two smaller rooms to become a kind of tail-wagging-the-dog in the entire operation?

Howard's reply, "People wanting to use the little rooms as opposed to the big rooms? No. We make sure the total ability of the main rooms is not here. You know, all of the equipment is bull. It's the guys. It's my mixers and I will go on record with that. It's the mixers that attract the business and what we're trying to do is accommodate them and develop other ones. The only way you can become a big mixer is if you work little stuff. But it's the guys; we just try to stay on top of the equipment."

SATELLITES

We wanted to know what satellite capability the studio had.

Figure 5. A completed studio 7 now ready for use.

"Basically what this does is eliminate the need for three producers, and a creative to get on a plane and fly to LA for two days and spend the airfare, the hotel rooms, meals, the whatever, to record one voice over for an hour. So now the talent goes to a studio in LA, star talent is frequently the scenario when it's LA to New York, rather than flying that person here and they generally can't leave because they're shooting something out there or flying this whole team of people from here to out there. A person goes to LA Studios or Waves, Fred Jones, or Bell, they walk in there, they talk into a microphone, we pull it down off the satellite here and it hits the tape and it sounds just like the guys are in the room with you. We now have stereo up and down links and we put in a second set of lines."

Howard said, "That's another thing that's really making us a lot different and that's what these rooms are for.

A lot of times we have set up a satellite network where we have this ability to record by digital satellite; we also have analog satellite.

We have the ability to record by satellite and send, up and down link, from here to a dozen studios in Los Angeles, Atlanta, London, Chicago, Cleveland, Boston, Miami, and New York."

> Having these rooms allows us to accommodate a small one-hour phone patch or satellite patch or pulling sound effects or any of that stuff, rather than booking one or two hours in the middle of ... an 8 or 10 hour day for a television show.

"A problem that we really had with the satellite is that the other day, Len Cariou, who happens to be here right now, was the star of Teddy and Alice on Broadway. He's the spokesman for Chevron, and he's a Broadway guy. Well, he played Flo Ziegfeld in London. So last week we had to set up a network to record in London two times. We've set up a network, London, New York, LA, so that he can be recorded. Chevron is a real good client for us. These rooms will also accommodate that. We do a lot of work out of town, phone patches where you don't need a giant recording studio that has a concert grand piano in it and nine sets of drums. We have a small voice booth, and one guy comes in, we hook it up by telephone, and bingo, he's on here, by satellite or by phone patch, he's all over the country, wherever he wants to be. Basically, we've set up six avenues for talent, the talent pool in New York, to be utilized, and vice versa, we've set up six avenues here for the agencies to receive talent from all over the world."

"Can all of this be done in the smaller rooms?" we asked.

Howard's response, "Absolutely. That's what these rooms are for. What will happen is we'll do a half with a half phone patch for a tag yesterday, the guy was doing dealer tags for two lines. The guy goes in here, truly 15 minutes, and it was a nice booking. What would have happened is it would have been in one of the big mixing rooms because when somebody calls, we don't care what they ask us to do, if we can fit them in, we do it. We charge by what they are doing, not by the room. If an advertising agency comes in here and is doing the post-production for a video mix of

Figure 6. Studio 8, busy at work.

a television commercial it's the same price as if they were on the SSL. They're getting the same thing accomplished.

WHAT THE ROOMS DO

Having these rooms allows us to accommodate a small one-hour phone patch or satellite patch or pulling sound effects or any of that stuff, rather than booking one or two hours in the middle of what would have been an 8 or 10 hour day for a television show."

BUILDING THE ROOMS

Since we had earlier been given a number of pictures of the construction of the rooms we turned the conversation to the building of the rooms.

Howard said, "We've gone full circle from where we started out with little rooms and built up to big glamorous rooms and now we're going back to the little rooms that are stripped-down versions of the big rooms that can handle lots of tasks for less money. All on one floor, thank God. Our big studio, which we still do a good share of music in, but not as much as we'd like. We have a big studio that I'd like to cut

in half and make into another post-production room. Every square foot of space that a violin player takes up I could put a digital machine or a 1-inch. Every time I put in a digital machine, a 1-inch or a 28-input console, I can bill twice as much as I can on a music date."

HARD DISK STORAGE

"If it's all here, you can just make a phone call, patch it down the line and boom, move it. Because we have hard disk storage now. We have a Compusonics, DSP 2000, and we've been using it for two years and it's spectacular. It's one source stereo output and two hours of recording. We have every laugh on the face of the earth on there...a giant, giant library of laughing. It's used to sweeten the programs, but we sweeten them as they run, as opposed to having a sweetening session. It just works better for us that way. We'll probably dump that stuff off, put it onto the hard disk system that's here; it can only be done on a hard disk system. So we're trying to figure out, that's why this junk is sitting in the hallway, if we can use it."

BUILDING THE STUDIO

We again tried to get the conversation back to the construction of the studios, particularly construction in midtown Manhattan. Howard's forceful comment on union construction is not printed. We asked Howard how different it might have been without union labor.

"Half the price—and time. We wouldn't have constructed the rooms any differently, but they would have been finished a month earlier and at half the price. We had two bids, union and non-union, the building would not allow us to build non-union."

"If we needed a piece of wood that was twelve feet long to come up here at 4:35pm, we couldn't do it without paying $50 an hour for a service elevator. We'd have to get another union guy to pop the hatch out of the elevator and stick the wood through the roof. A different guy than the guy who operates the elevator. What happens is that the union was a real problem. You can't get into the loading dock unless you have a union card."

GRAND CENTRAL STATION

We wanted to know what particular difficulties exist in being in a building that is literally adjoins Grand Central Station, suspended over more than

thirty tracks, and quite an underground train system...?

It's important to have client comfort. They don't care about how much isolation is in those walls as long as it's isolated.

Howard said, "Basically the building has its own substation. The building is the size of a city block. The building has its own zip code. The Con Ed substation is downstairs. We take the power that is brought to us and we use the third leg of that power which goes to that substation and use that as our ground. We don't ground to the building, we ground to Con Ed. When we put in the first automated consoles from MCI in 1979, we needed giant grounding systems because we have the Empire State Building in line of sight, where we have many radio stations. We went down there, and lo and behold, the substation is right under the building, right where you come up the stairs through Grand Central."

HIGH RF

It should be explained to our readers that the Empire State Building is not just in line of sight, but you can look into windows. The RF problem should be fierce.

Howard responded with, "These big studios are totally lined with copper 'chickenwire' to prevent RF from getting into our audio room. The third leg of the substation is actually welded to the rails of ConRail and so the entire ConRail system is our ground. We're also on the 19th floor so we don't feel the vibrations from the trains. As far as the actual construction, it's more of a logistical problem than a design feature."

DESIGNING THE ROOMS

Now we wanted to know some things about the design of the rooms so Howard responded with, "Along with John Storyk Designs we decided that the whole concept of recording control rooms has changed. Nobody says, what kind of big speakers do you have? They tell you, better have some NS 10s. Or, I'm sending over my speakers. Basically when you're doing television, a big speaker is only to play to the advertiser. He doesn't care really, he wants to make sure he's spending his money and it sounds great. Whereas

what we care about is what it sounds like on the air, so Auratones or RORs or something of that nature is very important and we use NS10s as our primary monitoring system although in this room we are using the UREI 809s. The acoustics on the interior of the room are absolutely not essential anymore for a small facility because you're near-field monitoring. Near-field monitoring eliminates the necessity for the giant dollars spent on acoustics. Conversely, two small rooms next to each other, separated by a machine room, isolation is important. Most of

the work in this room is being done electronically not acoustically so the isolation importance was only in there, that's where we spent the most money. If and when we have voice recordings done, it's fine."

We asked, "Is everything floated?"

Howard said, "Yes, that room is totally floating and totally isolated from this room. I think we floated this floor, which we weren't going to do. The control room floor is double floated, and all those walls are floated inside these walls and so on and so forth. Most of the look of the room is

not acoustical, because you see it's transparent. It's all absorptive."

"We did use RPG diffusers, but we lacquered them because we didn't like the unfinished look and so we probably destroyed the way they use them. It's a very sexy little room because it's sexily lighted."

"I spent more money on little amps than I spent on a lot of stuff. It's important to have client comfort. They don't care about how much isolation is in those walls as long as it's isolated."

BUILDING HISTORY

Now we became interested in the history of the building that Howard Schwartz Recording occupies.

Howard told us, "WPA built this building in 1926. It was originally Graybar Electric, which everyone knows is wire mold. The building is now owned by Helmsley Spear. This used to be the home of all of the talent agents for television and theater in the old days and it has a lot of history. It was then taken over by A&P, then it was Condé Nast

for a long time, then J. Walter Thompson Advertising. This was afterward a big broadcast center, as a matter of fact, Grand Central Station, which you probably read about in the Times, is enjoying its 75th anniversary. Where the two tennis courts are upstairs (which is called the Vanderbilt Tennis Club) was where NBC broadcast the 1952 Presidential Republican nominations. That's where they originally had their two television studios."

"It's really is therefore, a historical building. I was the first recording studio on the East Side when we built in 1974. Consequently, the film and television post-production business for advertising had moved over here. You have numerous facilities east of 5th Ave. now. There's twenty of them within a couple of blocks. The only time that this studio was inconvenient was when we were doing a lot of music. As far as what our main business is, we're in the middle of everything."

"Just the enormity of what goes on in our facility like the construction, air-conditioning budgets were $65,000 for

two little rooms, and you could truly air-condition these rooms with two window units and not be bothered by the noise. $65,000 because of the isolation etc."

If you were starting from scratch all over again, would you be in Midtown Manhattan?

Howard's emphatic reply, "Yes, I would. But if I did it over again, I would kill myself to buy a facility. Midtown is a big place. I wouldn't necessarily be in this building again, knowing the things I know now. I would make sure there are no stairs to an elevator. It would be a 24-hour building, with 24-hour access. In order to be in a small business, in order to build anything, you can't build it from fear of flopping or fear of failing. You have to build it from growth and strength. You can't be afraid of any of your competitors, or equipment manufacturers. You must deal from the positive."

FROM BASEMENT TO VINYL

Corey Davidson sits down with noted producer Fred Zarr and gets a wide-ranging technical audio story of continuing musical and professional audio growth.

COREY DAVIDSON

• Fred Zarr has a well-rounded background in music composition, production, and performance. As of lately, Fred's input and insight has helped to launch the success of artists such as *Debbie Gibson*, *Pretty Poison*, and *Regina*. Blessed with perfect pitch, he began playing the piano at the age of five. Since his childhood, Zarr's relentless creative drive is perhaps best evidenced by his own 24-track recording studio, Z Studio, based in Brooklyn, New York. To date, he has accumulated a list of credits and professional associations that include the likes of *Madonna, Eartha Kitt, Kashif, Carly Simon, Whitney Houston, Sheena Easton, Dionne Warwick, The Village People, Break Machine, The Spinners, Stacy Lattisaw, Pretty Poison, Samantha Fox, Phil Ramone, Eddie Money, Marshall Crenshaw* and *Herbie Hancock.* He is presently completing a movie score with Tommy Page for a Susan Seidelman film entitled *Cookie* starring Peter Falk, and has just cut 2 songs with producer/writer, Arthur Baker. Quite a

cross section! Fred invited me to his very private residence/studio where we conducted our interview.

AN EARLY BEGINNING

How did you become infected with music and creativity? "In high school I was very involved with the school's drama productions. It was in high school that I was musical director for a show called *Sing* and at that time started playing with groups doing some gigs here and there. I was a keyboard player. Those early band experiences led to more professional gigs like the wedding scene, the bar scene/hotel scene. I dragged around a suitcase model Fender Rhodes piano, a Farfisa organ, and ultimately, a Moog Sonic Six. The Sonic Six broke me into the realm of synthesizers. My next big synth was an Oberheim OBX. It was a lot of stuff to drag around but I wanted to have a good time and having a bunch of keyboards was my ticket."

"I started studying piano when I was five years old and continued on with my studies with different teachers and ex-

plored different styles of music. Jazz was one of my favorites. I went on with school at the Manhattan School of Music where I studied for two years and majored in music theory. I left the Manhattan School and went to Kings Borough where there was a program for union musicians. I spent about a year and a half at that school...so I've had a lot of formal training."

Could you describe the transition from gigs and schools to recording and the music industry? "Basically the industry door opened for me when I got an offer to go on the road with Evelyn Champagne King. We did a U.S. tour for four months. When I finished that road gig with Evelyn, I pursued work doing recording sessions. Some of the early records that I played on started doing fairly well in terms of sales. The success of those records led to more session work. I began to fall in love with the world of recording. Dance music really appealed to me. I guess it became a comfortable and stimulating musical style for me. One of the early highlights in my career was the work that I did on

Madonna's first album. After that album came out, I got a lot of work."

"In those early sessions that I played on, there was no sequencing ability available at that time. Those quick ripping parts, such as bass lines and arpeggiated riffs, had to be played manually on a keyboard." That's what we call *chops*.

"On the very early sessions I was mainly a piano player. Synthesizers were a decoration. As the gear developed, I began exploring sounds on more capable synthesizers as they became available. Usually I was asked to help out with the organization of the musicians, arrangements...and/or maybe help out with the vocals. This started work for me that was extending into areas of production. Even though I was hired as a musician, they often had me doing more than just play. I welcomed the experience and I know that this kind of experience would give me an advantage later on."

So this post-school phase of your career was a new *real-life* experience? "Yes. I absorbed and questioned producers whenever I could. Wherever I was and whatever studio I was in, I asked questions that pertained to the equipment and tricks that were being used. All of the information that I accumulated over those years has enabled me to make the right choices for myself...for my own studio."

What kinds of projects do you aspire to, now that you have your own studio and can have it *your way*? "Most of the projects that I have engaged have been dance and pop projects...actually more pop than dance. As a matter of fact, the projects have been mostly pop. However, the material is often crossed over to the dance market by simply remixing the material, giving it a different sound appeal."

I now had to be very selective as to which machine I was to purchase. It was a much bigger jump to make than I had ever imagined

Debbie Gibson, although she is billed as producing/writing her own music, has in fact received a great deal of help from you in her music's production and direction. Could you elaborate? "Well, it's changing a bit from her first album

Figure 7. Smile for the camera. Fred Zarr in his studio.

to the one that we're working on right now. On the first album I had a lot to do with the choice of the first song. At this time it's not really that clear as to who decided...but I remember that *Only In My Dreams* was the song that *I* wanted to do. At the time, everybody was hot on another song which will never appear as a single although it is on the album."

What kind of material and what medium does she actually bring to you when she introduces *her* ideas? "She's got a 12-track AKAI mixed down to cassette with which she demos her tunes. Those demos are fairly good representations of the tunes but certainly not record quality. More recently, due to her busy schedule, she hasn't been able to demo all of the tunes. Some weeks ago I went over to her place and she played some of her ideas for me on the piano with vocal. That was her demo, just piano and voice. From that I picked the songs that I liked and we

started working on them. On this most recent album she's got a lot more input. She is producing nearly half of the album and I'm producing the other half with her...co-producing. Of the songs that she is producing, I am programming and arranging. Basically I lay out the arrangement and instrumentation, then she (with the label) will be replacing those parts with live musicians. This album will display more of what Debbie herself is capable of. This latest album is almost complete and is scheduled for a fall release."

Is having this 24-track studio in your own dwelling just a convenience? "I originally built this studio long before I began producing. Back some time ago, I was a session player and much of my work was in programming synthesizers which involved numerous keyboards. It got to the point where I just couldn't move all of the stuff around anymore. I figured that if I built a studio, a good portion of the people I had been working with would come to me. They'd bring me a tape or demo, work on the song and finish it wherever they wanted. That worked out for a while. People were coming here and the studio was well supported by the traffic."

ADDING TRACKS
Could you tell us about the progression that took place in your studio from its earliest stages? "I started with a Tascam 40-4 four-track tape machine and a little Tascam Model 2A mixer. I discovered that a greater mixing ability was badly needed so I invested in a Tascam Model 5 mixer. The Model 5 made my life much easier but, of course, the track space became inadequate. The next purchase was a Tascam 38 eight-track tape machine. From that set-up, my little studio was actually capable of generating record quality products. I did some writing on the 4-track, expanded my outboard complement, and got a real good feel for recording in-

house. The more I worked on the 8-track, the more I collapsed (bounced) tracks. After a while this became somewhat unbearable. The only relief in sight was to, once again, increase the track space. Upon making the decision to go 24-track, I now had to be very selective as to which machine I was to purchase. It was a much bigger jump to make than I had ever imagined. I now had to bring in consultants and acousticians."

What spurred the purchase of the Studer A80? "Well, I knew that there was a lot of Studer out there in the world and I wanted to be compatible with what most good studios had. It's a good machine...a real workhorse. I don't have an in-house tech person, so I can't afford to have gear breaking down. The A80 is dependable. So that was the original intent of my studio...to have other producers come in and use me for my keyboard/arranging abilities. One thing led to another. My studio is very comfortable to me. That comfort factor enables me to work without paying much attention to the clock. This freedom further facilitates my work as a producer. If there is something that I want to do that seems to take forever, I don't have to charge the record company. I'd rather have it *right* than have the pressures of time and money dictate the recording process. I always come within budget on records and I charge less than I would have to pay in a studio with equivalent or comparable equipment. If I decide to do something at three in the morning, I can just put up the tape and do it myself. These kinds of freedoms cannot be had under more conventional circumstances."

MODIFYING THE CONSOLE

Did this MCI JH428 console have the potential for automation at the time of its purchase? "The VCAs were already installed and ready for automation. I was able to use the automation right away, but there were drawbacks. First of all, you could only have two mixes up at a time. As more passes were made, pieces of mix information would get lost. Glitches and little inconveniences became unbearable. This console is originally from another studio in New York City. This JH428, when at its original home at Blank Tapes Recording Studios (N.Y.C.), underwent a number of positive modifications. The intrastage transformers have been removed. Specific transistors and integrated circuits have been upgraded, and various

switches and potentiometers have been replaced. At this moment, the console is in perfect audio condition. Yet, there are some design modifications that I am anxious to obtain. There is a modification for the VCAs that will enable them to be bypassed. This can improve the signal due to the reduction of electronics in the signal path. With this particular modification, rotary pots are implemented. Upon going to tape in the record mode, the signal can be re-routed so that the VCAs are not in the path. This is only the case when in *record*. Of course, when mixing down, the VCAs are in the path again. I do know that whenever the amount of electronic componentry is reduced, the signal's original integrity is better maintained."

> Some people are shocked to see this sequencer and can't imagine how I might use it when there are computers that can, for the most part, out-perform a hardware dedicated sequencer.

How have computers affected your work and creativity? "The heart of what I'm doing as a producer lies in the ability to document musical ideas, arrange and orchestrate parts in software. The computers that I use are my work palette and the way that I use this system of computers is determined by the kind of project that I am currently working on. Lately I have been using the sequencing software as an aid in working on vocal parts. I can experiment with vocals on tape while listening to the keyboard parts. Once we have arrived at a vocal idea, the keyboards can be adjusted and readjusted without wasting track space and/or worrying about recording levels. As the ideas become solid, the parts can start going to tape. Most of my work on the computers consists of good sketches that enable me to understand the direction of the music and the compatibility of vocal and instrument parts. Although I have excellent computer hardware and software, these devices never substitute for feel, so, I am still a *player* and prefer to work within the rules of musicianship."

How easy is it for you to take the work that you do here in your home and interface with other, larger studios? "Although my studio is home-based, I can

interface with outside facilities. For instance, I don't have a grand piano or a large ambient room here, so those kinds of things must be done elsewhere. The computer-based work that I do can easily be brought to virtually any other facility provided that they have the same computer. Even if they don't have the same computer and complement of software, it is not unreasonable to bring in my computer...it's very portable. More elaborate mixing configurations are often needed to complete an idea...again, an outside facility can be used and remain compatible with what I have in my studio."

DESIGN PROBLEMS

Did you put much into room design? "Well, by comparison to other 24-track facilities, no. But there were problems that had to be overcome. Some of these problems included the transfer of sound from walls, to floor, to ceilings. Another problem was the lack of available space. The console position would be practically on top of the tape machines. This presented a noise problem."

How did you deal with the wall to floor to ceiling vibration transferral problems? "The answer there was to float the walls and ceiling. That construction feat took an extra two and a half months but was well worth it. The noise problem with the tape machine was overcome by building a separate room for the A80. This was accomplished by sectioning off an area with a sliding glass door. Now you can be sitting at the console, turn your head to the right, and see the machine in its full glory...just three feet away. The room is insulated from the outside environment. No sound leaves this room...no sound comes in. It *is* very quiet down here in the basement."

Fred, in looking over your instrument array, I see that you have some pieces that are considered by some to be outdated. How do you justify their use? "I notice that you're looking at the Voyetra, Mini Moog, and the Oberheim sequencer. Basically, every instrument has its strong and weak points. The older analog synthesizers that were of high quality in their day, are still able to produce sounds that some people hope to find on newer instruments. Isn't it crazy for someone to spend five hours searching for a fat analog-like bass sound on an Emulator IV when they can get that sound up in seconds on a Moog? Even the Oberheim sequencer

can do some things more quickly and easily than a computer with a complement of software. Some people are shocked to see this sequencer and can't imagine how I might use it when there are computers that can, for the most part, out-perform a hardware dedicated sequencer. But one has to realize that you can't always rely upon automation and digital devices...you know?!"

Fred, would you believe that I still use three DSXs? It's true. About twelve years ago, I asked my electronic music professor (Joel Chadabe),"Why would anyone still want to use the patchable analog Moog system?" He said, "Because that instrument is very much like an old camera that still takes very good pictures."

"I share that philosophy." said Fred.

EXPANSION CAPABILITY

What are some of the guidelines by which you purchase new equipment? "I won't buy something just because a client wants to see it in my studio. If I don't want it, I won't buy it. I have confidence in my taste and abilities. As a keyboard player I have had to stay abreast of changes in instrument technology even though I'm not a technician. As a matter of fact, I think of myself as one who avoids technical issues...probably because I never really knew why these instruments do what they do. I'm not really sure if I am at all interested in a component-level understanding. For me, in my work, knowing how to use an instrument is far more important than the 'hows and whys' of its operation. When I buy equipment I have to know that it has an immediate relevance to my work. The comfort factors in my studio depend upon peoples' confidence. If they know that you do good work, the equipment becomes a little less significant. Just like in any business, the people, with their abilities and talents, will always outweigh the equipment. I do realize the importance of maintaining a state-of-the-art studio and when I go out to look for that next piece of equipment, I thoroughly research the item in terms of function and cost effectiveness. If I'm convinced that the piece will make an improvement in the studio's potential, I'll buy it."

It has been my experience that a studio like yours, that is to say a well-endowed home studio, can lead you into other areas of production. Are you presently interested in entering the realms of post-production or music for video, scoring, etc.? "Yes...these are things that I'm very interested in. I haven't had any experience scoring as of yet so I haven't had any offers to score. I think that I could use another side of my brain and explore different kinds of music that is inside of me...more creative and less limiting in terms of tempos and hooks."

You seem to be right at the edge of having the ability to change and/or expand. "I'm very happy with what I have and the way in which I work, but I do realize that those expansions and changes that you mentioned are just around the corner. For right now, I'm

free to work on the projects of my choice. Paying the bills and working at what I like to do best is what its all about...yes?" Indeed.

Z STUDIO EQUIPMENT LIST
Console:
MCI JH428 automated mixing console with IBM computer with 30 megabyte hard drive for Disk Mix automation

Tape Machines:
Studer A-80 VU-24-track with remote
Technics RS-1500us 2-track
Denon DR-M33HX casette
Nakamichi MR-1
Sony PCM 601 ESD digital 2-track processor with Sony SLHF-450 stereo hi-fi Beta video recorder

Monitors:
UREI 809s
E-V Sentry 100s
JBL 4401
Yamaha NS-10Ms
Aurotones

Outboards:
Orban parametric-621B
MXR-dual 15 band graphic EQ
(2) UREI 527A graphic EQs
Kepex 2s
Kepex RM-160 Gain Brains
Drawmer DS201 dual gates
(2) dbx 160Xs
dbx 166 compressor/limiter/gates
(4) Valley People dual Dyna-Mites
(2) UREI 1176LN compressors
(2) Lexicon PCM-70s
Lexicon PCM-60
Lexicon PCM-42
Yamaha Rev-7
Roland SDE-1000
(2) Yamaha SPX-90s
ART 01A

Microphones:
Neumann M-49B
AKG C-414
(2) Electro-Voice RE20s
Electro-Voice RE15
Sennheiser MD421-U-4
Shure 57s, 58s
(2) Shure SM-11s

Synths/MIDI:
Oberheim X-pander
Oberheim OB-X
Oberheim OB-8
Oberheim DMX drum machine
Oberheim DSX sequencer
Yamaha DX-7 II FD
Yamaha DX-7
Yamaha TX-7
Yamaha RX-11 drum machine
Yamaha CKP-80 electric grand piano
Octave Plateau Voyetra synthesizer with Voyetra keyboard
Mini Moog
Moog Sonic Six
Roland D-550 (rack) with PG-1000 programmer
Roland SBX-80 sync box
Roland SVC-350 vocoder
E-MU Emulator II with hard disk drive
AKAI S-900 sampler
Korg EX-8000 (rack)

MAXIMUM POTENTIAL
Come with us way downtown in Manhattan where we find a major musical artist and sound designer who began as an audio tinkerer.

COREY DAVIDSON
● Greenwich Village, New York, up until recently was traditionally considered to be the artistic capital of the United States. Although the area has become gentrified, The Village (as it is so fondly referred to) has retained much of the artsy-craftsy charms from yesterday. Today, some of its prominent and successful inhabitants are members of a super-high-tech commercial art world. As a matter of fact, our interview was with one such person who is known as EBN. But there's a twist...he never intended to become a commercial artist.

EBN (pronounced eeben) built his first recording studio at the age of 16, a four-track facility on 6th Avenue in New York City. At that time he also mixed a live show for the legendary Jimi Hendrix. He later founded Sundragon Studios where the Talking Heads recorded their first album and where artists such as Ravi Shankar, Roger McGuinn, Felix Pappalardi, The Ra-

mones, David Johansen, John Cale, Brian Eno, The Plasmatics and many others produced world-renowned records. He became one of the first musicians to extensively record with a guitar synthesizer. As his interest in electronic music continued to grow, he began scoring for TV and film and doing independent production for other artists.

Since his earlier years, EBN has transcended many levels of music, all the while staying on top of technological advances as they became realities. He was one of the first people in the country to use the Fairlight CMI system as a compositional tool...a tool that he has been exploiting for more than 10 years. More recently he teamed with singer-songwriter OZN to form the successful duo EBN-OZN which recorded a hit album and several hit videos for Elektra. Currently he has been working with Neil Kernon, programming the Fairlight for the group OLE for Arista Records and is in the

process of forming a new band of his own.

NO SOAP
I met with EBN at his loft in Greenwich Village, New York, where he is currently compiling ideas for a new Miller Beer ad campaign.

How many things are you actually working on at this very moment in time? EBN tells me, "I have recently teamed up with Dan Aron, president and creative director of No Soap Productions, Ltd., the New York-based advertising music, sound design and radio production company. Although the No Soap relationship involves projects that are geared toward making commercials, my personal artistic projects are really my main concern."

EBN was born and raised about five blocks from his present location in the Village. "My earliest interests, other than eating, included the work that my uncle was involved with as an electronic engineer."

At three years of age EBN was a tinkerer. "I would take things apart and study the 'guts' of all sorts of equipment, but the tinkering stage took a turn when I was about 10 years old. Music was rapidly becoming my main interest and I was no longer concerned with how things worked, but rather, I wanted to explore the instrumental possibilities. I studied drums when I was about 11, which is the only instrument on which I have ever had any classical training. I am self taught on all other instruments. At eleven, I joined my first band. It wasn't too long before I discovered my love of the guitar...particularly the electric guitar."

"I became involved with the New York rock music scene when it was in its heyday. When I was 16 years old I opened my first 4-track recording studio which was just around the corner from the famous Electric Lady recording studios where Jimi Hendrix cut many tracks. My studio was a commercial space and I sold time to all kinds of artists...all kinds of music."

What kind of background/environment did you have that enabled you to jump into the commercial studio business? "I had been hanging out at studios such as Electric Lady and a close friend of mine was co-producing Stevie Wonder. I was very young when I became involved with music and recording. Felix Pappalardi (original bassist with the rock group Mountain who later became renowned for his production talents) was a very close and dear friend of mine and my associations with him exposed me to the concepts and processes that I later pursued. I became very excited by the combination of music and technology. Back then,

much of the equipment was archaic in comparison to today's gear."

THE EARLY DAYS

What were some of your early commercial projects? "Back then, my studio was open to the public, so, whatever came in, we would do. One day it might be a rock project. The next session might have been jazz, and then, maybe reggae. I was happy just to be behind the console and running the tape machines. I learned by doing. After that, at age seventeen, I worked for

Figure 8. The artist sits at his console and keyboard.

about a year (the only nine to five job he ever had) at No Soap Productions as an engineer, recording jingles. It was at No Soap that I learned many of the tape editing skills, which still to this day I am using. It's interesting how when you look back on things, you can see the progression of learning stages and how they are so much a part of what you become. I always learn some skill, even from the smallest project, that I can or will later apply to whatever I do thereafter."

"The next studio that I opened with my partner, Michael Ewing (one of the original owners of No Soap), was called Sundragon Studios. That was ultimately a twenty-four track studio and as a matter of fact, was the first studio on the east coast to have multi-track Studer tape machines. The Talking Heads recorded their first album there. Felix Pappalardi did a lot of production work there. We had a lot of cutting edge musicians in that studio. It was the newness of the styles of music and open minds of the artists that helped me to obtain a grasp of the things that it took to properly, yet creatively, document the music. During the past 15 years or

so, I have worked on many records, however, it has been a priority to write and produce my brand of original music. In 1978, I produced my own band's (Riff Raff) first album for Island Records. In 1982 I did another Riff Raff album for Atlantic Records. In 1984/85 was the third album for me called EBN-OZN on Elektra Records. That album contained a couple of hits entitled 'A,E,I,O,U And Sometimes Y' and 'Bag Lady' which were both accompanied by hit videos. That was the last record that I have done as an artist. I am currently looking for a male singer to complete my latest project."

EBN is very committed to pursuing his career as an artist but with his talents in such demand, he often finds himself fulfilling obligations as a commercial sound designer. His most recent relationship with No Soap Productions is certainly a highlight. No Soap has landed some of the world's most sought after accounts such as Pepsi, Coke, Mercedes Benz, TV Guide, AT&T, Sunoco, Taco Bell, Kodak, Firestone, ABC, Burger King, and McDonald's to name a few.

DIGITAL CAPABILITIES

Dan Aron, president of No Soap Productions told me in a telephone interview, "EBN is ahead of his time...especially in his strongest areas which include sound design and the realization of a producer's wishes. Back in his EBN-OZN days, EBN's stuff was too crazy for commercials. Now, in the 80s it's *right on*. His facilities at Maximum Sequential Potential are not just technological instruments...they are his tools...a way for him to create. His studio, typically, cannot accommodate guest engineers. MSP is EBN's special world with many advantages for the commercial design projects on which we collaborate."

Dan Aron, who has nearly 20 years experience in disc jockeying, selling radio time, and making commercials, says, "Because of MSP's extensive digi-

tal capabilities, you can try all sorts of things and if you don't like it, you can dump it. You don't need a full-blown recording session to find out if ideas will work. The collaborative process by which EBN and I work, is analogous to the relationship between producer and artist. I work with EBN in very much the same way that a producer would do a record. EBN has built an impressive reputation in today's popular music scene and has the unusual ability to translate these skills into powerful, persuasive commercial music. By taking advantage of all the technological advances currently available, he brings a whole new dimension to advertising."

> **Conventional tape recorders don't change very much from year to year. Even outboards don't change very much...they just become more multi-functional.**

EBN says, "All of my hardware is not here to be rented. This equipment is here to subsidize my talent so that I can work for people. It's not a studio for hire."

You mentioned earlier that you were a tinkerer and enjoyed the 'techy' relationship with your uncle, the electronic engineer. How interested are you in a component-level understanding of electronic musical instruments and processors? "I was never really concerned with the component-level operations of equipment. However, I have been very interested in making the most use out of the interconnections/logical flow of electronics and musical processes. The ability to pull out the most from a piece of gear depends more upon how things work...not necessarily why they work. Because of my years with equipment, I certainly have developed a feel for troubleshooting electronics on the macro level. In other words, I will know, quickly, if a piece of equipment is not working properly. I then pull it out of the rack and stomp on it. Well, not really. What I mean is that I will not open up that piece of equipment and go into it with a soldering iron. I draw the line there. As a creative person, I don't have the time to explore circuits."

"I like to make an analogy between electronic music/software and electronic instruments/electronics. As you obtain software, you must become aware of the processes by which you utilize the maximum potential of that piece of software. One doesn't need to know how to write the software in order to maximize its use. The same could be true for electronic instruments. The processes and realization of the instruments potential is far more important to the artist than the instrument's design and construction. Understanding processes is the artist's greatest advantage."

FAIRLIGHT FLEXIBILITY

"The Fairlight, which is my main music computer, has become the tool with which I define the processes and approach to my music. All of the tape editing techniques that I acquired over the years are now applied to digital editing. There are some similarities between analog and digital editing, but the potential and flexibility of the Fairlight has facilitated a whole new approach to composition. I have used virtually every electronic instrument known. It is the exposure to these instruments that has helped me to acquire a taste for the equipment that suits me best. For me, the Fairlight is the instrument that satisfies my needs on many levels."

The strange thing about EBN's history with synthesizers is that his approach has been one of a guitar player's. He was one of the first artists ever to extensively use a guitar synthesizer. "That first system was the 360 System's guitar interface that was used in conjunction with an Oberheim SEM module. This was a monophonic system. I progressed onto the ARP Avitar and ultimately on to polyphonic systems. The funny thing is that many people think of me as a keyboard player. In fact, I'm not a keyboard player. I can diddle. I can comp on keyboards, but I would never hire myself out as a pianist or as a session keyboard player. I have tried to integrate my guitar approach with electronic music."

"I had a Sequential Circuits Prophet V custom interfaced so that I could use it with my guitar. Whatever I was using as a synthesizer always had an interface so that I could use them with guitars...because that's my instrument. The problem with controlling those instruments was that they required new techniques and methods of playing."

Conventional tape recorders don't change very much from year to year. Even outboards don't change very much...they just become more multi-functional. However, an astounding progression has been observed in the development of synthesizers.

Would you elaborate on your progression with synthesizers? "My use of synthesizers has progressed from using my guitars to drive them, to using a synthesizer to document and manipulate entire musical orchestrations. The difference between the technology behind a monophonic analog synthesizer and the technology behind a digital/sampling synthesizer is tremendous. I am grateful, however, that I have had an extensive exposure to synthesis from its earliest beginnings. The logic that I use to maximize my ARP 2600 (a manually patched, analog synthesizer) can be conceptually applied to many aspects of the sound design work that I am doing currently. Isn't it ridiculous to spend an hour with a sampler in order to get a simple sound, as opposed to two minutes on a small analog synthesizer?"

PROGRESSING SEQUENCERS

So far you have discussed your use of sound generating instruments. What about control and sequencing? "The 16 stage ARP sequencers were the first for me. There is a knob for each note that you want played. Each note must be *tuned in*. You can't just play a keyboard and have these ARP sequencers spit the lines back out because they have to be manually programmed. This was my introduction to sequencers. The other way to record music, other than using tape, is to store notes and information in memory. The analog sequencers did that. But with analog sequencers, there is no way to edit or off-load what you have done. It was this type of sequencer that introduced me to the possibilities of sequential manipulation. I was now concerned with levels of control rather than multi-tracking."

The sequencing controls, like the synthesizers, also went through a rapid progression. At first sequencing was locked into the divisions of the clocks which drove them. Then there were 'real-time' sequencers that *seemed* to give you back exactly what you played. Then came quantization which enabled correction to the nearest beat value. EBN says, "Ultimately, sequencing can slip and slide in whichever way we want so that it can sound perfect

and/or sterile, random and unpredictable, or any combination of these qualities. The important thing is that we are now at a point in the evolution of technology and music that we can choose. In working with my new drum tracks, I'm recording direct to hard disk. At the same time, while I am recording direct-to-disk, I'm getting all the triggers off the drums recording MIDI. So, I've got the real performance of the acoustic drums on hard disk, which is completely editable, as well as having the actual trigger information from MIDI available, running in sync on a sequencer/computer. It was played once in real time and the data is there in both forms, all completely editable. If I want to use the performance from chorus 1 and I'm triggering some of the drums, I can also use that same performance from the hard disk, edit it into another section along with the MIDI data, and they will all lock together. If you were dealing with tape, this kind of thing would be very time consuming and your tape would look like shredded wheat."

> I can sequence all my rhythm tracks which include bass, drums and percussion. I often sample my guitar parts directly into RAM so that I can have 25 or 35 second stereo samples of my performances.

To what level of completion do you take a project? "Well, basically I do it all here...from start to finish. This is an on-line studio although there are instances where I go off-line. The last record that I did was done partly here and partly at the Power Station."

What was the medium that was transferred from here to the Power Station? "Fairlight. We took the Fairlight to the Power Station because there were things that we wanted to take advantage of at that mammoth studio. I'm going to California with the Fairlight."

How feasible is the transportation of such a sophisticated and expensive instrument? "I am soon to be the proud owner of 400 megabytes of hard disk storage in a case that I can carry. What this means is that I will no longer have to cart the Fairlight anymore. When I get to my destinations, at the other studios where they too have Fairlights, its just a matter of a ribbon cable. Ob-

viously, if you are an on-line type studio where you can finish and complete projects, you can also be an off-line studio."

COMMERCIAL BREAK
Has your break into the commercial business been everything that you thought it would be? "This break into the commercial business has been different than I thought it would be. I've met some very talented people and they have helped me hone my sense of focus. There are methods and processes that apply to commercial

advertising which are applicable in other areas of production and recording. It's a good training ground that I believe I will able to apply to my own creative endeavors outside of the commercial fields. Whatever field(s) you expand into, you learn things that will serve you later."

Would you explain in greater detail, the type of Fairlight Series III system that you have and how you use the Fairlight in its tapeless capacity? "Currently, I have a 16 voice instrument. A voice on the Fairlight is not analogous to a voice on a conventional synthe-

AES Show Debuts New 2/3/4 Channel Amplifier, Selectable 600/210 Power

The new model 300X4 MOSFET power amplifier from Soundcraftsmen will have its debut at the upcoming AES convention in Los Angeles, California. This new amplifier is a multi-channel design allowing the user to select either two-channel, three-channel or four-channel operation. It is ideal for the large recording studio needing very high power for their monitors—600 watts per channel (two-channel) at 8 ohms, or wishing to bi-amp their monitors—210 watts per channel (four-channel) at 8 ohms.

Or tri-amping using two of the 300X4's (each in the three-channel mode) to provide 600 watts per channel for woofers, 210 watts per channel for mid-range and 210 watts per channel for the high frequency drivers.

The new 300X4 has all the performance you've come to expect from Soundcraftsmen in a convenient, three-rack-space chassis. The 300X4 has two completely independent power supplies and two separate power transformers, sharing only a common power cord. Extremely accurate clipping indicators are included for each channel.

The new Soundcraftsmen 300X4 is completely protected against short circuits, open circuits and input overloads. Thermal protection is provided by Multi-Sensor Phase Control Regulation as well as two multi-speed cooling fans. The new amplifier is standard rack-mount, 19"W x 5¼"H x 12"D, weighing 58 pounds.

Circle Reader Service Card # for 200-watt Amplifier Comparison Chart

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motifs from the 1950s. Furniture, lighting designs, decor, and structural layout have all been conceived in this 50s motif. One might ask, why the 1950s? "Well, we found the environments of that period to be elegant but not overstated. The designs are sharp and yet not imposing. The chairs, couches, shapes of the rooms, etc. all suggest shapes that cater to the human body. There was tremendous emphasis during the 1950s to stress ergonomic designs that comple-

Figure 9. Studio A master control at Sanctuary. Note the producer's desk with the Synclavier keyboard on it.

mented human forms. This period was abruptly ended with the onslaught of space flights and the radically changing politics to follow during the 1960s."

"Everything that is the decor at Sanctuary came from all over the country. Many pieces were acquired from dealers, and others came from private collections. As you can see, all of it is in mint condition. The lighting is important, too. As you will soon see, when we begin the tour of the studio, most of the lighting is indirect and very natural. Studio A has the option of natural light from outside...a rare feature for a recording studio to say the least. There are times when a client wants very little light, particularly in the lounge areas. Remember Lava Lites?"

Yes, I still love them...very relaxing. "Well, there you are. We have many interesting light sources including Lava Lites throughout the studio. Shall we take the tour?"

The first room Howard shows me is the MIDI room. He says, "This room is rented out for one year. We are not really interested in having a permanent MIDI room for a number of good reasons. One reason for not building a permanent MIDI facility is that the equipment changes so quickly that we would soon have piles of antiquated instruments. By renting the space for MIDI we can have a rotation of effective instruments and personnel. The

MIDI specialists often find the need to work in other facilities. The MIDI equipment, as opposed to the recording equipment, is transportable. As a matter of fact, I will show you our MIDI tower on wheels in just a few moments. Right now we have this room complete with Kurzweil 250, PPG Wave with its complement of outboards and terminal, computers/software, and a host of MIDI processing and other MIDI keyboards. Next year, the picture may completely change to include the next incredible instrument or computer."

Flanking the MIDI room are two editing rooms. Howard tells me that there is a concept behind these editing rooms. "When we began designing the studio, there was the concern that the client who needs editing time doesn't really need multi-track time. However, in most facilities, a multi-track room would be tied up by a client who needs only to edit. As a result, that client may have to spring for the cost of, say, 24-track time to do nothing more than edit a 2-track tape. At Sanctuary, the two editing rooms serve two purposes: one is to enable the editing clients to have exactly what they need at the lowest possible cost, and two is to enable the studio the freedom to book time in the multi-track rooms for the clients who will take full advantage of multi-track time. This is one of the ways to increase traffic and efficiency simultaneously."

MIDI TOWER

In the second editing room, I spotted the MIDI tower that Howard had told me about. The rack is nearly seven feet tall and contains almost every rack mountable MIDI brain. "This rack on wheels can go anywhere in Sanctuary. Its unique open-tubular design is a custom rack design that we have employed for all of our rack-mount applications. All the instruments are accessible individually and in any combination. For most keyboard and guitar-interfaced situations, this rack has proven to be more than enough...even for those hard-to-please MIDI enthusiasts. We carefully researched MIDI instruments. We investigated which instruments have been used on particular records for particular kinds of music. Once we had an idea about the instruments that are used on records, we chose a representative for each category. FM, analog, linear, hybrid (wave samples), digital, sampling synthesizers, and sampled disc players make up the tower. In the event a client finds a need for something that isn't in the tower, the piece they need can be here in a matter of minutes from any number of local rental houses."

Next stop is studio B. "Every room has a combination-keypad that unlocks the door to each studio suite. There are no keys to mess with. The combinations can be changed at a moment's notice. The client and staff that book a particular studio receive the combination to their studio and lounge for the duration of their sessions. Only the clients and the people who are relevant to the session have access to the combination. On every suite combination-keypad, there is an on-air indication light that is connected directly to all tape machine input status. When any machine, any track is put into input, the on-air indicator lights up on the door to the suite. This prevents anyone, even persons who are relevant to

the session, from disturbing a recorded moment."

Howard punches in the code and we enter the studio B suite. "Every studio suite is like its own island, complete with lounge."

Howard and I walk through the lounge and into studio B's control room. One of the more striking features in this control room is a reversed LEDE (live-end, dead-end) type design. Howard says, "Although there are limited parallels in this hexagonally shaped room, we were careful to eliminate, wherever possible, any unwanted reflected sound. There is reflection damping on the front of the console and on front of the control room wall. After analysis, we discovered that having a semi-reflective rear wall was the answer in order to achieve a subtle ambience without adding any confusing delay factors. However, we also discovered that the front wall was bouncing some of the rear wall information. Hence, the dead front-end. Under the Angela console there is nearly a foot of concrete...solid. The walls and ceilings are all tripled sheetrock with nearly two feet of insulation behind them."

To the side of the control room there are glass doors sectioning off the isolation room...an altered diamond shaped room. "These glass doors are extraordinary. They were manufactured by a company named Eurotech in Germany. These glass doors are made specifically for sound isolation purposes. There are many places where one can purchase heavy glass doors, but not a single company here in the U.S. manufactures acoustically designed, vacuum loaded/suspended doors. When the doors are slid shut, they appear to behave like any other sliding glass door. However, when the handle is turned up, all the air is drawn out of the upper track, suspending the doors off the floor. The cushion of air that results from this vacuum isolates sound far beyond the realms of conventional glass doors of any thickness."

Figure 10. Otari MTR12 tape recorders sit in this view of the editing suite. Note the 50's type lava lamp on the table.

CUSTOM RACKS

Sanctuary is loaded with innovative designs. Other impressive highlights are the outboard racks and monitor stands. "The outboard racks, like the MIDI tower, are made of tubular steel frames. The best way to describe these is to say that they look like the suggestion of a box without any sides, just edges. These racks were custom designed from a commercially available rack configuration that is widely used in retail stores. We had a welder install rack rails vertically along the front edges and then refinished the metal at the weld points to match the existing matte black finish. They are completely exposed on all sides eliminating the need for fans or cooling of any kind. This accessibility also facilitates the simple removal and servicing of any outboard piece at any time...in seconds."

"The WestLake monitors are not designed for soffit mounting so we chose to suspend them on tubular stands with sharp and pointy steel standoffs that completely isolate them from the floor, walls or ceiling. To increase the isolation, all the tubes in the speaker stands are filled with sand. The cabinets are impaled upon these conical points and as a result, are anchored at an angle facing the mix position. The stands can be relocated instantly, adding even

more to the flexibility of the monitor's sound field."

As we leave studio B, Howard points out the tech/repair, storage, bathroom and shower locations. Again we are at a door with a combination-keypad. Howard punches in the code and says, "There are two accesses to studio A."

We walk through another beautiful lounge and into the live studio space. "The floor in this room is parquet wood. Gobos and baffles are custom designed."

Howard pulls one of the large wall baffles away from the wall and tells me, "These panels are held to the walls by Velcro. See? (Howard points toward the wall where it meets the ceiling.) Up along the entire perimeter of the room is a Velcro strip. Each baffle has the Velcro *mate* on the back. All of these baffles can be relocated so that acoustics can be adjusted to taste, fast!"

Free standing gobos of unusual design can be moved about the room. "These gobos are particularly suited for drums. They are constructed of wood, metal, and plexiglass. The plexiglass, located near the top of each panel, serves a double purpose. It functions as a window for improved visibility and communication as well as a reflective surface which enhances the liveness of cymbals and overhead sounds. The lower portions of the gobos can dampen, direct and/or isolate the activity of sound in the room."

ELEMENTS IN STUDIO A

We walk back through the A room lounge and into studio A's control room. Two elements are immediately noticed. The tight, impressive formica finishes and a massive window to the outside. "We are fortunate to have had this 10,000 square-foot space because we have the whole floor. This means that we have access to the perimeter of the floor. This perimeter comprises the

outside walls of the building. In other words, we have windows. It can be nice to know the approximate time of day and condition of the weather. Most studios are like submarines...you don't have a clue as to the time of day. Not to say that this is always important, but it can certainly be a nice option."

"The formica, again in the 50s motif, is of original design and like most formica, very solid and durable. All of the formica crafting was customized to house the console and outboard table. This API console is one of a kind. We have installed a moving-fader automation system that works in conjunction with Disc Mix automation. Although this configuration is typically 32 by 24, the monitor section and effects buses can expand this board to 48-track capability...a truly flexible console. Again we are using the West Lake monitors with one exception...a sub-woofer system. Jim Falconer, who has designed many premier New York studios, was the man behind the Sanctuary construction. In the early stages of conceptualization, we met with Jim many times in order to come up with studio designs with a unifying concept."

"After some experimentation, we discovered that we wanted to offer our clients the option of a unique low-end reference. This desire culminated in the conception of a sub-woofer system that can activate an exiting low-end response. It's an important feature for the dance music producers. The sub-woofer enters where the West Lakes drop off. Furthermore, the sub-woofer system can be bypassed at will to give the client every perspective. When switching between sets of monitor speakers, the sub-woofer system automatically comes up with the West Lakes, but can be removed when necessary."

This is a very large control room...and for good reasons. "The tendency to *cut* in the control room has increased. Keyboard rigs have gotten extensive and complex, so the preference to record in the control room has become widespread. To service this trend, we have patch points to the console from all over the room. There never need be cables weaving across the floor, into direct boxes, into the console inputs. Should an artist be cutting from the rear of the control room, the instrument(s) can be patched at the rear of the control room...or anywhere for that matter. Guitar players and other instrumentalists enjoy the freedom of recording in the control room. We chose

a control room design that could handle virtually any kind of performing musician."

Off to the rear corner of A's control room, there is a door. Howard says, "Let me show you another special Sanctuary feature."

After he opens this double set of doors, we walk into a sunny hotel-type suite. "This is the producer's lounge...or anyone's lounge. Hotel accommodations are very expensive in New York and we felt a need to address this dilemma. Again, in keeping with the motifs of the studio, this suite holds fast to the 1950s look and feel. The double doors shut out sound so that one could sleep undisturbed while others were recording. However, if the suite's inside door is left open there can be just enough leakage so that a producer can be removed from the control room and yet still have a connection to the music."

Our final stop was the Synclavier/MIDI suite. This is the room that truly places Sanctuary on the "audio for video" and "post-production roster." Howard tells me, "Right now we use the Synclavier mostly as a super-sampler. Flying in vocals and special effects is a breeze. When the Synclavier is used in conjunction with our MIDI tower and complement of available house keyboards, the maximum sound generating potential of Sanctuary is realized. There is enough MIDI/sound generation and sequencing so that one really doesn't have to use any tape time until they are finished with the whole concept."

In closing, Howard describes the Sanctuary philosophy, "There are literally hundreds of multi-track studios in the Metro New York area. Many of these studios have taken out huge leasing contracts on mammoth consoles and designs only to sell time at a low-ball rate in a desperate attempt to stay in business. We, at Sanctuary, realized that we needed a special edge that wasn't just hype and environment. We know that technical flexibility comes first, but we also know that creativity and comfort can be directly proportional. Sanctuary has left no stone unturned. It's all here...every technical option plus comfort factors that surpass most standards."

STUDIO A
Console:
API, 32 x 24, custom console with Disk Mix automation and API moving faders

Tape Machines:
Studer A820 (0.5-inch)
Studer A820 MK III 24-track
Nakamichi cassette
Monitors:
Westlake BBSM-12s
Yamaha NS-10Ms
Electro-Voice Sentry 100s
Intersonics SDL sub-woofer
Amplification:
Bryston 6Bs and 4Bs
Outboards:
Lexicon 224XL
Alesis Midiverb
Ibanez SDR 1000
Lexicon PCM-70
Yamaha SPX-90
Yamaha REV-7
AMS RMX-16
(4) TC Electronic 2290 digital delays
Lexicon Super Prime Time
UREI 1176-LN
Drawmer dual vacuum tube 1960
dbx 160X
Teletronix LA-2A
Drawmer DS 221 dual compressor/limiter
Dual Strate gates
(2) Dual Drawmer gates
(8) Kepex II gates
(2) Pultec EQs
Roland Dimension D SDD-320
Eventide Harmonizer H949
Klark-Teknik DN30/30 graphic equalizer
TC Electronic 1210 Spacial Expander

STUDIO B
Console:
Amek Angela (36 x 24)
Tape Machines:
MCI JH24
Ampex ATR 100
Nakamichi cassette
Monitors:
Westlake BBSM-12s
Yamaha NS-10Ms
Electro-Voice Sentry 100s
Amplification:
Bryston 6Bs and 4Bs
Outboards:
Roland DEP-5
Ibanez SDE-1000
Alesis Midiverb
Yamaha SPX-90
Roland SDE-3000

(2) TC Electronic 2290s
dbx-160X
UREI-1176
Teletronix LA-2A
(2) Dynamic noise gates
(2) Pultec EQs
TC Electronic 1210 Spacial Expander

EDITING SUITE

Tape Machines:
(2) Otari MTR-12s (0.5-inch)
(2) Otari MX 50-50s (0.25-inch)
Nakamichi MR2 cassette

Monitors:
Electro-Voice Sentry 100s

Amplification:
Bryston

Reverb:
Roland DEP-5

SYNCLAVIER/MIDI SUITE

Equipment:
Velocity keyboard with VT100 graphics
(80+15 megabyte hard disks; 8 megabyte ram)

Console:
Audio Arts 8 x 24 (for effects and monitoring)

Monitors:
Yamaha NS-10Ms
Electro-Voice Sentry 100s
MK sub-woofer

Amplification:
Bryston 2B

KEYBOARDS AND ASSOCIATED MIDI GEAR
Roland Juno 60
Roland Super Jupiter MKS80
Super Jupiter MPG80 programmer
Yamaha DX-7 II FD
Roland D-550
Roland MKS50
Yamaha TX802
Yamaha TX81Z
Yamaha MEP-4
Roland Octapads
Korg DVP-1
Roland MD-8
Alesis drum machine HR-16
Alesis MMT-8 multi-track MIDI recorder
Doctor Click

Emu SP-12 drum machine
Roland 808 drum machine
AKAI S900
Linn 32-track digital sequencer
Forat F-16 sampler
IBM PC with Voyetra and Sequencer Plus software

OTHER AVAILABLE OUTBOARDS
Publison Infernal 90
Neve EQs
Focus-Rite dynamic compressors
Focus-Rite remote mic preamps
Neve dual limiter/compressor

Dimension D
TC Electronic 2290s

MICROPHONES
Modified Neumann U-47 (by Stephen Paul)
Modified Neumann U-87 (by Stephen Paul)
Shure SM-57s
AKG 414s
Electro-Voice RE20s
AKG 460Bs
AKG CK-8s
Sennheiser MD 421s   db
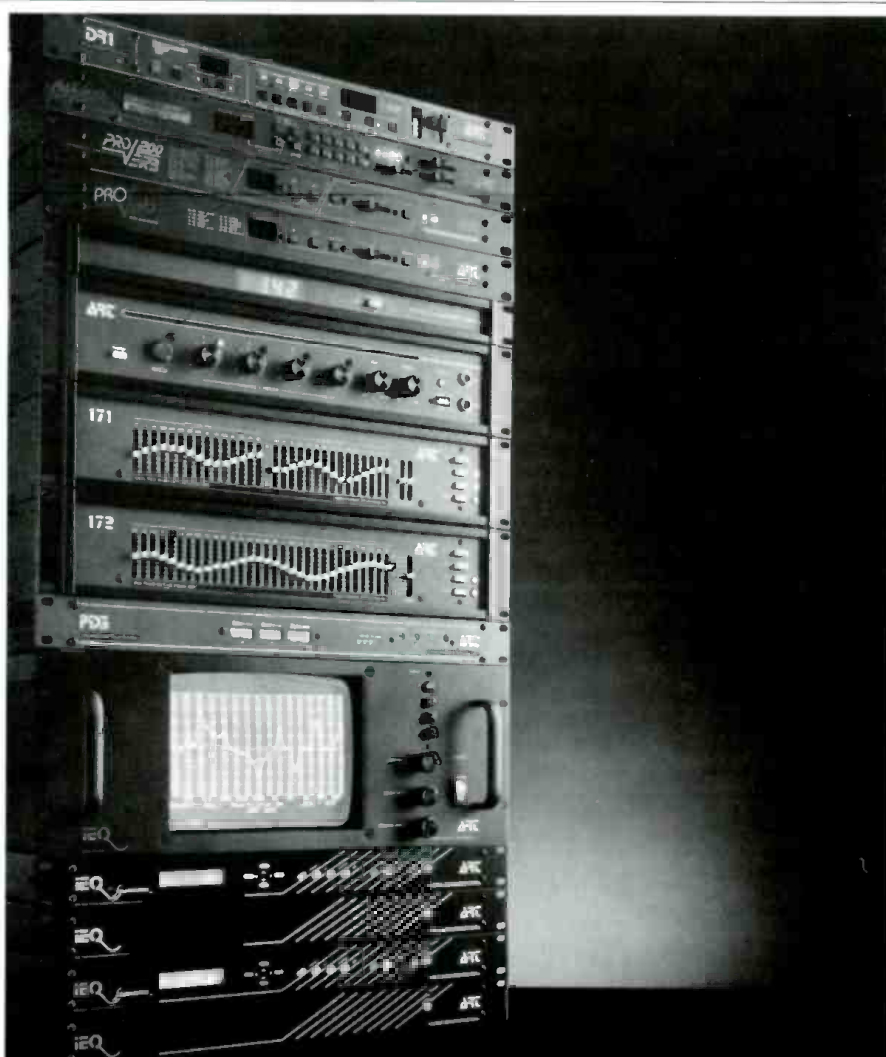
Broadcast Audio

THE FIRST STEREO OLYMPICS

Q: What temporary facility requires two full-blown audio and video control rooms, four large on-line edit rooms, eleven small edit rooms, a total of over 100 video tape machines, and a full complement of compact disc players, eight-track audio tape recorders, and other audio, video, and graphics equipment too abundant to mention?

A: NBC's facilities for coverage of the Games of the 24th Olympiad in Seoul, Korea.

MILESTONE SOUND

The 1988 Summer Games mark several milestones in Olympic coverage. It is the first time such coverage has been delivered with stereo sound, and also the first time the half-inch professional M-II video tape format has been used for such coverage.

M-II video tape machines feature advancements in both video and audio performance. In addition to dedicated longitudinal and vertical-interval time code tracks, the M-IIs have stereo longitudinal audio tracks the performance of which is enhanced by both the use of metal tape and by built-in noise reduction. They also have a stereo pair of FM audio tracks, which deliver virtually transparent audio performance, but have the disadvantage that they cannot be edited separately from the video. The four audio tracks served the NBC Olympics production team well. Each of the many stereo-equipped venues delivered video and four audio signals to the NBC broadcast facility at the International Broadcast Center on the island of Yoido on the Han River in Seoul.

These four signals consisted of a stereo NBC unilateral or "full mix" audio feed containing natural sound, announce audio, and music, and a stereo NBC international audio mix, composed of natural sound only. The few NBC mono audio feeds coming from venues which delivered signals via microwave equipment incapable of stereo operation were passed through stereo synthesizers to widen their sound field and thus provide a more consistent sound when this audio was juxtaposed with the true stereo that accompanied most programming. The mono international audio feeds provided by the Host Broadcaster, the Korean Broadcasting System, were also synthesized for the same reason.

> From Seoul 1 the signal was uplinked to an Intelsat Ku-band satellite, and subsequently downlinked at an earth station at Santa Paula, California, where it was re-uplinked to enter NBC's SkypathTM satellite system.

The previously described complement of audio and video production and on-air broadcast equipment and the staggering number of stereo signals used in the NBC broadcast facilities would indicate the need for a great deal of audio wiring, and it is not surprising that the routing switcher used for Olympics production and broadcast was of a rather large size. In addition to video, key, and timecode switching matrices, the router employed an audio matrix of 192 stereo inputs by 288 stereo outputs. Because the switcher was under the control of a supervisory computer, a highly flexible approach to configuration was possible. Thus, although the audio matrix was a stereo, or two-level switcher, subselects were employed that permitted two stereo audio sources to be called up with an associated video source. Thereby, an M-II machine could call up a video source accompanied by both the two-channel stereo unilateral audio feeding two audio tracks and the stereo international audio feeding the other two audio tracks. The audio could also be broken away from the video in any manner desired by the operator.

DELIVERY BY SATELLITE

With all production requirements taken care of, there remained the task of delivering video and stereo audio to NBC's broadcast operations centers in New York and Burbank, California, from the other side of the world. The video signals were sent via two separate paths for redundancy. The primary video feed, accompanied by backup mono audio, was sent on a fiber optic link from the NBC broadcast facilities at the International Broadcast Center to "Seoul Earth Station Number 1," a portable Ku-band uplink facility located in the IBC parking lot. From Seoul 1 the signal was uplinked to an Intelsat Ku-band satellite, and subsequently downlinked at an earth station at Santa Paula, California, where it was re-uplinked to enter NBC's SkypathTM satellite system. Parenthetically, this marked the first use of Ku-band satellite technology in Korea. The secondary video and audio backup signals were sent via microwave to an earth station at Kumsan, Korea, where

it was uplinked to an Intelsat C-band satellite. This signal was downlinked at Triunfo Pass, California, and sent via microwave to NBC Burbank, where it was uplinked to the Skypath network.

Intelsat is not equipped to pass more than a single channel of audio, so Olympics stereo had to be sent to the U.S. another way. The stereo audio was sent to the United States on an AT&T T-1 digital data link. A T-1 circuit is essentially a two-way digital trunk line, providing a 1.54 megabit data stream in each direction.

For the Olympics, the T-1 carrier was configured to provide two 15 kHz digital audio paths, plus coordination circuits, data circuits, and telephone network tie-ins between NBC's United States and Seoul facilities. The T-1 signals were delivered to NBC facilities in New York and Burbank by AT&T.

TIMING DIFFERENCE

The fact that audio and video traversed completely different paths in their journeys from Seoul to the United States produced a discrepancy in audio/video timing. Because of the required frame synchronization of the video signal, the audio travelling on the T-1 carrier arrived at its destination before the video. This circumstance provided a convenient means to re-establish lip-synch with the use of a variable digital delay device at each destination. Each delay unit was adjusted for proper video/audio synchronization by use of specially prepared synchronization test tapes.

The result of all this was that the United States television viewer could sit back and enjoy all the Olympic action with the enhancements of stereo sound and excellent pictures, and need not be concerned with the extensive planning and execution that went into producing the programming and sending it around the world.   db

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This report by contributing editor Randy Hoffner was sent by him to us by fax from Seoul, Korea, where Randy was supervising broadcast audio for NBC's coverage of the Olympic events.

Watch this space for more articles on audio at the Olympics in coming issues. Ed.

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Ad Ventures

THE BASICS OF COPYWRITING

● As proprietor of a fully self-contained production house or recording/performing/marketing company, you have to know the different elements of preparing broadcast advertisements. From time to time we've examined equipment, explored techniques for people who work at or with radio stations, and in the last *Ad Ventures* I devoted this space to a potpourri of handy tips for greenhorns, hackers, and even some ideas for you old stalwarts who still toil in primitive studios. So, what should we get into next? Most **db** readers are fairly clear on how to use their equipment, and if you're a musician, there's no way I can teach you anything new about composition, arranging, and playing synthesizers and stuff. So here comes a short course on how to write copy for radio commercials.

I've often stated that radio spots have to be designed to motivate a listener to react instantly by simply showing up on the sponsor's doorstep, cash in hand.

Although some radio and TV spots are referred to as direct response ads ("Call 1-800-555-1234 right now and use your credit card to order..."), most of the commercials you produce will be of a more indefinite nature. They'll be one of three other basic types:

1) Those geared toward a future event (Party at the Vile Inn this Saturday with the Spandex Geeks and two drinks for the price of one...")

2) Information on an event or sale that the sponsor hopes customers will look into ("Uncle Drippy's Used Groceries is holding its monthly going-out-of-business sale now through Saturday and all prices are slashed up to fifty percent...")

3) A public awareness or image spot (Drink Burpo Cola because it's more fun than falling into a vat of battery acid...")

Unlike direct response commercials, these advertisements rarely sell products; they just bring prospective patrons to the merchant's door. The most important single element of a radio commercial is the "copy," or script that the announcer(s) will read.

BELIEVING IN THE PRODUCT

When you set out to write a commercial, your first step is to believe in what you are doing. If you hold the opinion that advertising is generally an enterprise of bull, hype, unethical, or amoral damage to society, and noise pollution, then stop reading now and forget about the potential income you might gain from cutting commercials. It's true that, unfortunately, not all advertising is good, but it isn't all necessarily evil, either. The ads *you* write will be informative, helpful, honest, and profitable for the listener/customer as well as the retailer.

To prepare a good commercial, you must care about the merchandise. Get to know the product you are selling. (We'll call anything advertised a "product," whether it's an actual piece of

tangible merchandise, a car wash, a movie, an accounting service, an insurance policy, a bank, a store, or a rock concert.) The idea is to present a convincing argument for why the listener should try it. The best approach is to treat him or her as a friend. You can't convince a friend to invest in something you don't personally believe in. You also can't convince a friend to try something that you've never tried or seen for yourself. So, the first step is to research the product. Find out what it's called, what it does, how it works, how much it costs, how it came into being, and why people who use it will benefit.

Next, you must understand the target market. Who is most likely to buy the product? What type of music appeals to them? What sort of language do they respond to? What are their main interests and concerns? After you've identified the market, seek out any obstacles there may be to selling it. Is it overpriced? Too revolutionary? Is there a better product offered by a competitor? Does everyone already have one? Is it dangerous? Is it just plain boring?

You have to write copy that will do four things:

1) Get attention.

2) Point out the customer's need for the product.

3) Describe the product in a clear and exciting way that shows how well the product fulfills that need.

4) Stimulate action.

If the copy doesn't grab the listener's attention and hold it, you're licked from the start.

WRITING EFFECTIVE COPY

How do you get "up" for writing an ad? Easy: start writing. Nothing tricky about that, is there? Pretend you're writing a letter to a friend, and that you sincerely want to convince your friend that he or she desperately needs the product. Just write it out. Use free-form, random, stream-of-consciousness terminology, spontaneous vocabulary, and positive expressions. Let go of your natural urge to write

"perfect" sentences, and toss words onto the page as quickly as they pop into your head. It's much easier to edit and clean up your writing later than it is to get the stuff down in the first place.

Once you've got some thoughts scribbled out, here are the four key points to incorporate in all effective copy:

Rule 1) Get Attention. What's the first positive thought that comes to mind when you picture the product? Be specific; don't just say it "works great." What do you mean by "great?" And how does it "work?" Sex is great, and so is driving a well-made automobile, yet they appeal to somewhat different desires. Get to the bottom of the matter right from the top. A powerful ad might start by saying that you'll "never have to wash your car again" if you use Glop-Max Car Wax. Now, that's a grabber. I'd want to know more.

Rule 2) Point Out A Need. What will this product do for me? Tell me why I want to have it. For example, almost everyone likes a shiny car, since it looks better and keeps the finish from wearing off. But shiny cars require hard work. You either pour on the elbow grease or fork out the bucks to have someone else do it.

Rule 3) Describe The Product And Show How Well It Fulfills The Need. Be precise and explicit; paint a word picture. Exactly what is this product and what benefit does it offer? Perhaps it's "the only non-toxic car wax that tastes like beef, so your neighbor's dog will do the buffing for you." If I view waxing my car as a bothersome chore, this just might be for me.

Rule 4) Stimulate Action. Tell the listener exactly what he must do to get this product. Give him an easy-to-remember description of when and where it can be purchased. "See your Glop-Max dealer" is too vague; why not say, "Pick up a can of Glop-Max at Greasy Gil's Auto Supply across from the Landfill Mall. On sale this Saturday only." That's likely to set me in motion, since I can mentally picture myself driving over and getting some.

If your advertising copy covers these four points, you will rarely fail to pull in a respectable number of customers, assuming that the product is halfway decent and that the advertisements are reaching the right audience.

These are the mere rudiments to get you going. The art of writing good, effective advertising copy occupies volumes of books and magazine articles. Just remember that a creative idea can be revised, edited, and reworked to fit the above guidelines, and in a future column, I'll list some specific copywriting "do's and don'ts" as well as a few more general rules.

TALKBACK MIC
Since the last *Ad Ventures*, I've been bringing a wheelbarrow on my daily visits to the Post Office. In fact, several dozen recording professionals have requested particulars on my forthcoming audio cassette program *How To Produce Great Radio Commercials*. My work on that project was slightly delayed by a badly broken ankle back in July (I was safe at second, though, and we won the game...as well as our second consecutive league title), and some heavy business travel. But, I've really been on the case and the master tapes will be done any day now. If you've written to me, I promise you'll get a personal letter from me as soon as the program is available, and I'll also be putting out advertisements and product announcements through as many trade publications as possible (including db). Thanx for your patience...A big welcome to Jon Rees, our new video producer at CareerTrack

Publications in Boulder, CO. Good luck and may Career-Track be *your* success company...Lots of readers sent in comments about the tips in the July/August issue: Thanks to Jeffrey P. Hedquist of Hedquist Productions, Inc. in Fairfield, Iowa. I enjoyed the innovative commercials on your demo tape, and I appreciate your suggestion. (I recommended putting masking tape on reels so you can write on it to identify the contents without leaving everlasting hieroglyphics on your reels. Jeff says he's left masking tape on for long periods and had it stick a little too permanently. He suggests you try Scotch 256 white paper tape or 3M cover-up tape #658 to put on reels so that you can write on 'em without marking the reels up permanently.) Stu Engelke, Chief Engineer at WZZD-AM in Lafayette Hill, PA notes that marking tape for splices as shown in Tip #4, Figure 3 will not only keep you from messing up your heads, but also tells you which end of a piece of tape is the beginning. Stu, that should help a lot of us avoid edits that sound like they belong on the Beatle's *White Album*...Hello to Robert Long of Optimum Sound in Little Rock, AR. I hope Allen Schultz's audio signal tracer can help you in your live sound work. Much obliged for your kind words about *Ad Ventures*, too...Regards to Carl Dansky of Sounds All Right! in Poughkeepsie, NY for your complimentary note. We at db always welcome a new subscriber. I hope to hear from you again when you get a typewriter!

Anybody else want to get into the act? Contact me directly by writing care of db, or drop a note to me at PO Box 17386, Boulder, CO 80308-7386. I answer everybody here in the column, and I love to receive demo cassettes of what you're doing!   db

THE ELECTRONIC COTTAGE

WHATEVER HAPPENED TO PAUL C. BUFF?

● This legendary innovator of pro-studio gear is now living and working in an electronic cottage—and loving it!

On a recent trip to Nashville, my friend, songwriter Bobby Tyler said to me, "Johnny, there's somebody I'd like you to meet while you're in town. He's an inventor and he's done a lot of interesting things in the recording industry. Maybe you might want to do a story on him."

Perennially skeptical of story leads, I asked Bobby to name something this guy had invented. He replied, "You ever heard of a gadget called a Kepex? Well, that's one of 'em."

Needless to say, I had heard of Kepex. Anyone who has worked in a professional recording studio will testify that racks of Kepexes are staple items—almost like milk and eggs in the household refrigerator. Over the past twenty years, as multi-track technology was growing up, Kepex was there to dial-out extraneous noise, to tighten up loose playing and generally aided engineers in creating a clean, professional sound. Kepex was the original keyable expander, and is probably still the most popular unit. In any case, until recently, it was just about the only game in town.

This powerful little gadget had gotten me out of tight situations many times, so I was definitely interested in meeting the mind behind it all. Still, I wasn't convinced that this interview would be relevant to the electronic cottageer, until I got to meet Paul Buff.

THE RETURN OF PAUL BUFF

In 1984, after nearly 30 years of involvement in the audio industry, Buff disappeared from the scene. (During that period he got interested in photographic lighting systems, a market he considers "lo-tech" compared to audio.) For nearly four years he had quietly distanced himself from recording studio technology, happy to be delivered from the perils of developing new products for that highly competitive market. But lately, as my interview with him reveals, Paul C. Buff has been bitten by the electronic cottage bug. Arriving at his Nashville home, I found Buff rediscovering his roots as a musician and recording engineer, revelling in the joys of MIDI, and feeling bullish about home studio recording.

Barilla: "Tell us what your interest is in the electronic cottage. Is it just a toy for you?"

Buff: "Well, yes and no. Usually, my hobbies become my business. It's in my blood. I'm looking for some alternative music form—children's music, children's videos. I always look for a new untapped resource when it comes to selling, and that applies to music, too, because I've had pretty good success with some of the stuff I did back in the sixties that have been used for TV theme music."

"One of them called "Drums A Go-Go" was used by Dick Clark for two or three years in the sixties, and now it's played every year in Germany. I don't know what they're playing it for, but I get three or four thousand dollars a year in royalties from the thing."

"So it (the electronic cottage) is sort of a semi-hobby, semi-research project. I'm looking for a little black box...almost all the products I have built have been of necessity."

MODIFYING EQUIPMENT

Buff told me how the original Kepex had evolved out of his Hollywood recording studio. In the early sixties, Buff had some of the first multi-track machines available at that time. He had them because he built them himself, modifying existing two- and three-track machines to his specifications.

His first project was a five-track monster, outfitted with a series of staggered heads. (This beauty now sits as a museum piece in Frank Zappa's personal studio.) In 1963, he went a step further, transmuting an Ampex 300 (1/2-inch three-track) into a ten-track machine, by manufacturing a 1-inch head stack, and modifying the transport and electronics.

To accommodate the additional tracking capabilities, Buff needed to build a custom recording console. As primitive and prototypical as this system was, Buff went on to engineer Sugarloaf's "Green-Eyed Lady," Strawberry Alarm Clock's "Incense and Peppermints," and a slew of other hits on this same equipment.

Buff realized early on that increased tracking capabilities led to increased noise. Circa 1967, he began building Kepexes for his own use to alleviate noise from the ten tracks. At that time, there were no commercially available noise-gates. The principle had been described in broadcast journals, but had never been applied to recording technology. The Kepex was so successful that in 1969 Buff started the Allison Research Corporation to manufacture them commercially. He left the recording studio and went on to design, manufacture and market such other popular items such as the Gain Brain and Dynamite limiters. He also pioneered such areas as VCA design, was the originator of Trans-Amp technology, and one of the first to develop a workable console automation system.

Despite his technical achievements, Paul Buff's fondest collection of mountaintop experiences seem to be much more musical in nature—when some local rock band called The Surfaris walked into his recording studio in Cucamonga, California, recorded a hit record in one hour, and rung up a whopping studio tab of $12.50 (the

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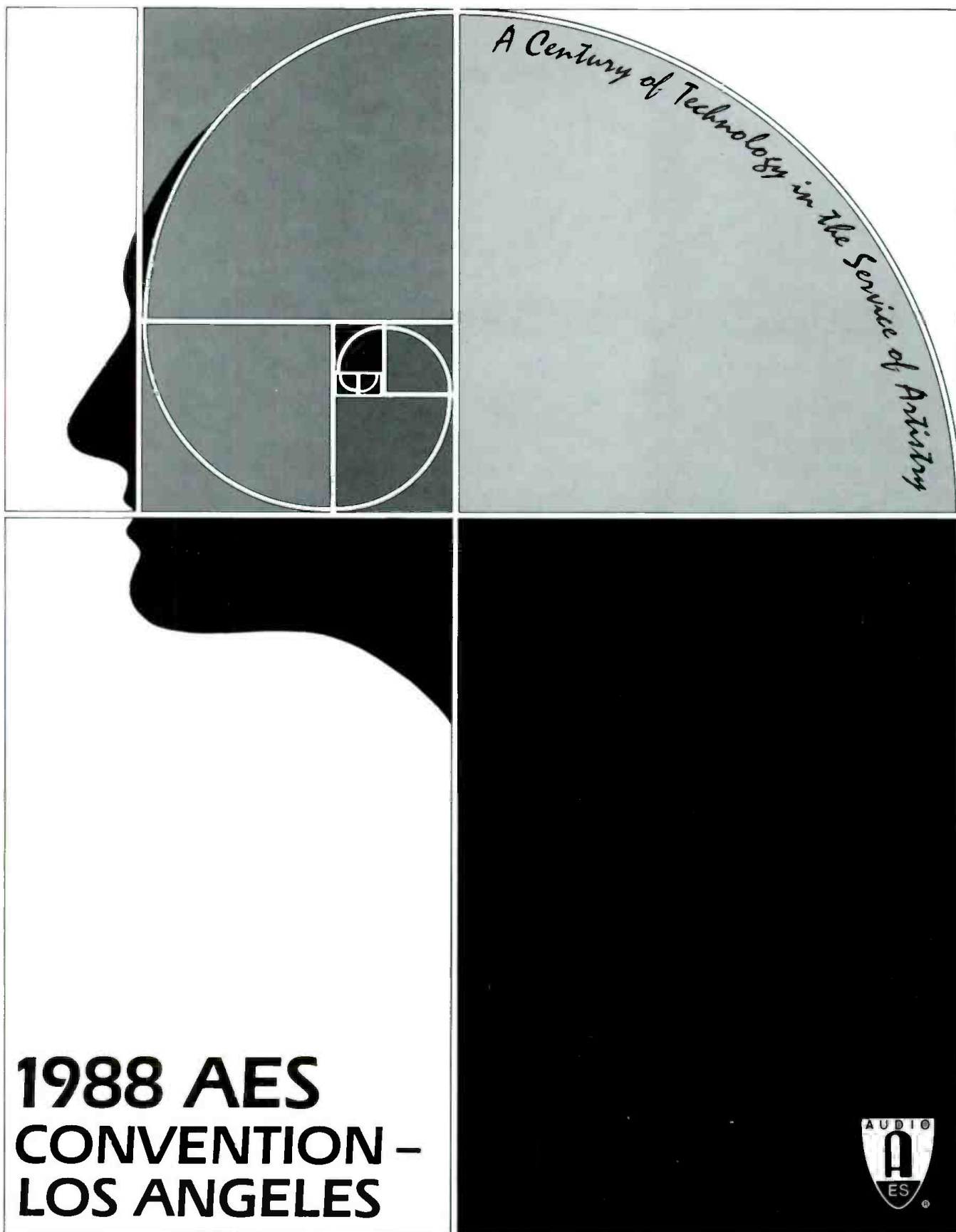
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going studio rate at that time). By the way, the song was "Wipe Out," a three-time number one song that seems to be rediscovered by each new generation.

Buff: "That record had every count against it. It was an amateur studio, amateur group, amateur producer, bad technology, but it had what it took to make it—which I always called sincerity. And it taught me a long time ago, that's what it takes to sell anything. It's not how good you are, it's how sincere you are. The kind of strokes amateurs make, professionals can't do."

Barilla: "Do you think that today with sequencers, etc., there is a tendency to tweak too much?"

Buff: "I've been in the audio business for 30 years—it's a double-edged sword—the digital and some of the stuff I manufactured, noise reduction, automation. They are great tools for making music sound really clean, but they don't make hit records. That's why I'm an advocate of consumer gear because if you take the hum out of it, it will make hit records just as well as Studer gear will."

Barilla: "Consumer gear is now commonly found in the pro studio..."

Buff: "Professional equipment is built in limited quantities, so it doesn't undergo the improvement and the design that consumer equipment does. So a lot of times, even though consumer stuff is considered 'cheap equipment,' it's more highly engineered and it works better.

"The Kepex was one of the first pieces of (pro-studio) equipment that didn't have XLR connectors, balancing transformers, and a lot of the things that add so much expense. It was one of the first modular-type systems, where you didn't have to pay for balancing transformers unless you needed them. Of course it was cussed at because of that. I was all in favor of weeding out the unnecessary things and offering the most gadgetry for the dollar."

Barilla: "Tell me about the famous Trans-Amp controversy."

Buff: "The Trans-Amp was—from where I'm sitting—the first really effective transformerless mic pre-amp. It was extremely effective. What happened when I designed Trans-Amp was that noise performance was within about 1/2 dB of the theoretical limit. When I began advertising it, I realized that it was 4-6 dB quieter

Figure 1. Paul Buff sits in his Electronic Cottage.

than anything else on the market at that time, but my competitors were advertising they were also at the theoretical minimum."

"I had a choice of saying, 'This is 4-6 dB quieter than the theoretical minimum,' or challenging the whole specification."

Buff went on to challenge the entire method of measuring noise levels, assailing both the premises and the laboratory technique of the other manufacturers in a series of now legendary articles in RE/P. Because of this, the industry ended up adopting many of Buff's arguments as measurement criteria.

Buff: "People were specifying console front-ends in dBm, and they were doing this when the term dBm didn't apply, because they weren't 600 ohm systems and it was a lot of confusion. As a result of this controversy, things got specified correctly using dBv and dBu."

In 1984, after seventeen years as an innovator of professional audio products, Buff sold his interest in Allison Research. Always a shrewd businessman, he decided that manufacturing the kinds of new hi-tech audio products that were currently on his drawing board was too expensive for a small company. Tired of the rat-race, he opted for a break from the world of audio and started a highly successful

Figure 2. A closer look at part of the Seck console and MAC Plus computer.

photographic lighting company—White Lightning.

Buff: "I got tired of being a company man and managing too many people, so I set up Paul C. Buff, Inc. strictly as a research and development company. I had a four-year non-competing clause with Valley People (to whom Allison Research was sold). But I'm free now!"

THE EC POTENTIAL

Today Paul Buff is a great advocate of the home MIDI studio, and a practitioner of the electronic cottage concept. He is particularly excited about R-DAT and its potential for flawlessly interfacing the home studio with the professional recording studio. But even at a more median level, Buff believes hit records and soundtracks can easily be made in the electronic cottage.

Buff: "Even for an investment of under $10,000, a good hip musician can create phenomenal MIDI things, and then just drag the bank of equipment down to the great digital multi-track recorder in the sky. He doesn't have to spend a lot of money."

"I look at it this way: If I were an artist type...if I had a budget of, say, $20,000, how much music could I make by renting a 'real' studio, versus how much music could I make by buying $20,000 dollars worth of equipment and working every day for a year. There's no contest. The real studio may have a quality edge, but not that great a quality edge to overpower the sheer manipulation edge that the home studio has."

"The whole modern music thing is a very mixed bag. Certainly, the MIDI stuff is changing how music is made, what music sounds like. It's also going to put some people out of business and it's going to make some people successful who wouldn't otherwise be."

Buff is currently toying with an idea to retrofit the unbalanced MIDI studio so that it might more easily avoid ground loops and attain increased noise rejection.

Buff: "I've always been an advocate of studio systems that are unbalanced out and balanced in—that is, active op-amp differential inputs which if the

wiring is right, they go back and they sense the output at its source. It's a great interface and it's a very inexpensive interface. I envision a 'powered' patch bay that would contain 16 or 32 active balanced inputs. You take consumer level equipment with its unbalanced inputs, add external power, properly fit it with differential inputs, and you can create a system that has no loops. This is by no means a proprietary idea. If anyone wants to take it and put it out, they're welcome to it."

COMPUTER POWER

A perusal of the equipment in Buff's studio reveals a pretty heavy concentration of computer power, but surprisingly not even one Kepex. Whether this is by accident or design is open for speculation, but Paul Buff's new outlook favors keeping to the pristine quality of the digital synthesizer as much as possible, without analog manipulation.

"The main thing I'm after," says Buff, "is to not commit things to tape. That's why I want so much multi-timbral ability."

Much of this multi-timbral ability is achieved through the three Ensoniq EPS sampling keyboards, each fitted with an optional output expander. The expander adds 8 separate independently assignable outputs to each EPS. Additionally, Buff will soon have on-line an optional 2X SCSI memory expander for each unit, which will essentially allow hard drive access and storage of twice as many sounds. This will allow setting up of complex orchestrations, and storing them so that they will instantly re-configure on the next session. Combining these 30 voices with the 24-voice capability of the Kurzweil 1000PX expander module, we can see why a rather large instrumental production can be kept in the digital domain all the way to mixdown.

Handling the manipulation of performance data is the Mac Plus, running Mark of the Unicorn's Performer 2.3 sequencing program. When vocals or live instruments are required, Buff records them on the Fostex B16-D, and

runs it in synchronously with the sequencer program, using a Fostex 4050 SMPTE/MIDI autolocator.

As to monitoring in the electronic cottage, Buff believes the old adage: "There is safety in numbers."

He puts it like this: "I've always liked close-field monitoring and I liked it 20 years ago when nobody heard of it. Second, there are no consumer tuned rooms. So what I always have done is have an array of speakers—from the little bitty ones right on up—so you can hear what it sounds like in a variety of environments, because the consumer doesn't have a tuned room either. People who buy records don't want a standard sound. They want something that will knock their socks off."

Will Paul C. Buff turn out hit records from his electronic cottage? Or will he use the EC to spawn a new generation of MIDI studio equipment? Only time will tell. But if history has a tendency to repeat itself, don't be surprised. db

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BUFF'S ELECTRONIC COTTAGE EQUIPMENT

Master Controller:
Yamaha KX-88

Synthesizers and Samplers:
3—Ensoniq EPSs with output expanders and SCSI memory expanders
1—Ensoniq Mirage module
1—Kurzweil 1000PX module

Computer and Software:
Mac Plus with Mark of the Unicorn Performer 2.3

Signal Processors:
Lexicon PCM 70
Yamaha REV 7

Console:
Seck 18x8x2

Tape Machines:
Fostex B16-D (multi-track)
Fostex E2 (two-track)

Monitors:
JBL 4311 (mains)
Realistic Minimus 11
Acoustic Research Powered Monitors

ED LEARNED

Sound Reinforcement in New Zealand and Southeast Asia

Television fans might not recognize Benny Golson, but they would recognize his work: Benny composed, arranged and conducted music for *MASH, Mission: Impossible, Mannix, It Takes a Thief* and many other hit shows. Jazz musicians and fans know another side of Benny; his compositions have become "classics" of the jazz repertoire, songs like "Killer Joe," "I Remember Clifford," and "Along Came Betty." He is an accomplished tenor saxophonist, a veteran of stints with Dizzy Gillespie, Lionel Hampton, Art Blakey, and currently leads, with Art Farmer, the Jazztet. Benny's 1987 calendar included an engagement in Bangkok, where he would involve himself in making music for an anniversary celebration, in honor of the King of Thailand, in October. Mindful of these plans, USIA (United States Information Agency) contacted Benny in late spring to investigate the possibility of a short regional tour, scheduled around his Bangkok commitment. USIA programmer Beverly Gerstein somehow developed an itinerary with little lead time, and the idea became reality when Benny accepted. With my previous regional experience (see db, March/April 1985, Vol. 19, #2), I was the logical choice to accompany Benny's group as production manager/sound engineer, a job I eagerly accepted. From September 8 to October 4, 1987, we would tour New Zealand, Malaysia, Singapore, Indonesia, and Burma, then travel to Thailand, where Benny would remain to concertize; the rest of us would return home.

ORGANIZING EQUIPMENT

The Benny Golson All-Stars, featuring Curtis Fuller, was a quintet that featured some of the greatest talents in jazz: Benny playing tenor sax, his co-leader Curtis Fuller on trombone, Mickey Tucker, piano, Ray Drum-

mond, bass, and Billy Hart, drums. When I phoned Benny to ascertain his sound requirements, I found that both he and Curtis would carry their own special clip-on mics. I would only have to provide mics for piano, bass, drums, and announcements, with appropriate mic stands. My most recent tour of New Zealand (see db, Jan/Feb 1988, Vol. 22, #1—my May 27-July 6 1987 tour with the Barrett Sisters) revealed that complete sound systems of high quality were available, so everything we needed could be procured locally. For the Southeast Asian countries, I felt we could at least procure adequate house PA equipment in each; we were dealing with acoustic jazz that didn't require high spl. Beverly and I drafted a cable that would be sent to the last four countries, describing our PA needs on a frequency response and watts-per-audience-member basis. While this meant our house sound could vary due to the PA-du-jour situation, I felt confident in my ability to "wing it" if I could carry my own console and front-of-house electronics. I didn't want the musicians to deal with any variables: to maintain a productive musical environment we had to have a consistent stage sound, so I also suggested that we carry our own monitor system with us. This "stage package" with house electronics would be cheaper to rent and ship than a full PA system, yet would still maintain a degree of quality and consistency. We could also bypass New Zealand and ship directly to Malaysia, saving more rental and shipping expense. My proposals were endorsed by both Beverly and Benny, so I set out to procure equipment that met my quality and USIA weight parameters: the entire system had to be under 1000 lbs.

I contracted Aerial Enterprises, Inc. of Whitmore Lake, MI to provide the PA equipment for this tour. I'd used Aerial equipment on previous USIA tours, and was extremely impressed with the quality and durability of their designs. Benny and I agreed that, with proper placement, 4 floor monitors

should be enough to service the band's needs. The Aerial floor monitors contained a 12-inch Gauss woofer and an E-V T-350 tweeter. The cabinet had an exceptionally smooth response without the harshness of high end found in most floor monitors. Aerial's proprietary passive crossover network was part of the secret, equalizing levels between woofer and tweeter to smooth out the difference in respective efficiency. Without bi-amping, the need for electronic crossovers and extra amp channels was eliminated, simplifying the signal path for greater reliability and saving precious size and weight. The monitors were shipped in their own packaging: two wedges were placed back-to-back, forming a rectangle, inside a wooden tray. Another tray was placed over the top, and two end pieces were placed over the speaker grills and fastened to the trays with built-in roto latches. This formed an exo-skeleton around the monitors, braced internally by the cabinets themselves (see db, Feb. 1985, Vol. 19, #1). A stereo amp was a necessity for monitors, as I planned on using two discrete mixes; a Carver PM 1.5 stereo amplifier was provided that could deliver 600 watts to each pair of cabinets, yet weighed only 21 lbs.! E-V ND-757, DS-35, and RE-20; Shure SM-58; and Crown PZM microphones rounded out my stage complement, along with several Aerial D.I. boxes. The front-of-house electronics complement included Yamaha 2031 graphic equalizers and an SPX-90 digital effects processor, with a CAE xpc-2 14x2 console. I carried a VIZ a.c. power line monitor, so I could have peak-reading voltage monitoring at the mix point. My 28-amp multi-tap Variac transformer, with a huge assortment of foreign a.c. receptacles, would serve to supply 120 V power to both the band and the sound system. Most of the power we'd see would be between 210 and 250 volts, 50 Hz. The custom flight cases for electronics, cabling, and stands were manufactured by Caravan

Cases of Elyria, Ohio. I shipped everything but the microphones to Malaysia on September 1; this gave us a safe margin of 17 days before we'd link up with the gear in Penang. This type of lead time is a wise idea when shipping equipment to this region. The mics were needed for my next major undertaking: engineering the Montreux-Detroit Jazz Festival, held every year over the Labor Day weekend. My commitment to Montreux made it impossible to attend the USIA briefing for the group, which would take place in New York a few days prior to our September 8 departure. USIA tour escort officer Arlene Jackson agreed that my previous experiences in Southeast Asia made my attendance superfluous, so I arranged to connect with the group in Los Angeles the day after the festival.

My flight from Detroit arrived a few hours before Benny's did, so I had some time to relax before greeting the group. Billy Hart and I had worked together before, so he handled the introductions. After the obligatory get-acquainted session in the airport bar, we boarded our flight for Auckland via Honolulu. Eleven hours and a day later (we'd crossed the date line, losing a day in the process), we arrived in Auckland early in the morning, Thursday, September 10. We were met by two familiar faces: American Center Director Vivienne Barnett and local jazz promoter Pat Shaw. Mindful of our jet-lagged condition, Vivienne had us through customs and resting in our hotel in record time. After a few quick media interviews, we were free to relax after our grueling travel day.

Friday was another free day, giving us more time to acclimate ourselves to the 16 hour time difference between Auckland and New York. After breakfast, I planned on walking over to the University to check out the Maidment Theatre, site of our first performance. Billy Hart decided to join me, so together we enjoyed the leisurely 20 minute walk to the theater, which included negotiating some of Auckland's hills on the way. We arrived at the hall to find it locked, as we were about to leave, the house tech returned from his lunch break; he was happy to give us a tour of the place. The theater was small, seating only 500, including a small balcony area (*Figure 1*). Acoustics were well balanced, with a reverb time of 1.5 seconds. I used the office phone to call Barton Sound, and got a

Figure 1. The Maidment Theatre.

hold of Dave Ormerod, who would be chief engineer at our performance. In deference to the small room, we agreed on the need to cut back on drum mics, and I gave him band layout and monitor mix information. Confident that things were in good hands, we returned to the hotel via several music stores, where Billy picked up some small drum parts; once he was recognized, they wouldn't let him pay for them! That evening, we attended a reception in our honor at the home of Mark Platt, the U.S. Consul-General in Auckland, where we met many local jazz buffs who were very excited about our impending

appearances in Auckland. Everyone expected a large turnout. Saturday marked the start to our performance schedule; it was a busy one, with both a morning TV taping and an evening concert. Billy and I left early for the studio to handle our respective set-ups. Our taped segment would be shown at the end of TVNZ's "Weekend" program, a Sunday morning magazine-type program. We were met by sound manager Gary Clark, who remembered me from the Barrett Sisters taping. We used a larger studio downstairs this time, and I was quite surprised when Gary asked me if I'd like to

Figure 2. TVNZ engineer John Dylan at the Neve console.

mix—last time I wasn't allowed. I eagerly accepted, and huddled with engineer John Dylan to discuss mic selection. The room was very live, so I wanted to eliminate some of the condensers he'd placed about. I stayed with AKG 451E mics on the tenor, trombone, piano, snare and overheads. I used my E-V RE-20 on the bass drum, and moved John's AKG D-112 over to the bass amp, where I planned to use it in conjunction with Ray Drummond's DI. My E-V ND-757 mics were used on the rack toms and floor tom. As we completed our set-up with the rest of the group, a new problem developed: Ray complained of getting shocks while plugging in his DI. I measured a whopping 140 V between the amp chassis and the DI, a situation which left the local techs aghast. I suggested lifting the ground on the DI, which eliminated the loose electricity and cleaned up the amp sound, but created a mild buzz at the console. As the amp sound was clean, I had to punt on using the DI and went exclusively with the amp mic, not the most ideal way to go. Our console was an older Neve, and I made sure the sax, trombone and bass were patched into channels that had on-board limiters (*Figure 2*). I also used the studio's plate reverb, fed by a tape deck with VSO so I could vary the predelay. I had the band run down several numbers as a sound check, then taped the 10-minute interview-cum-performance segment for tomorrow's program (*Figure 3*). After listening back to my mix, which earned me plaudits from the director and the group, we tore down and went directly to the Maidment for set-up and sound check.

Dave and Grier Gorboko from Barton Sound had everything prepared exactly as I had outlined over the phone. Things were a little weird with respect to the mix point: the Maidment's wide seating area, with no space behind the last row, necessitated positioning the house mix extremely house right, outside of the house right sound wing. Frequent walks toward the center of the hall were required to get a true idea of sound levels and mix balance. I tried to picture the relationship between a good mix in the center and what I heard at the mix point, so I'd have a frame of reference to mix from. The PA system was quite substantial, with 2 Barton 3-ways per side. Each 3-way contained 2 JBL 2225 15-inch woofers in horn loading, 2 JBL MI-10 10-inch woofers in horn loading with phase plugs, and a single JBL 2445 2-inch compression

*Figure 3. The Golson All-Stars rhythm section works out at the TVNZ sound*

driver on a Northwest horn (*Figure 4*). Crossover points were 250 Hz and 3.7 kHz. Power amps were Barton 350s, delivering 700 watts/4 ohms. My house console was a Yamaha EMX-300 12-input, with the on-board octave graphic equalizers providing house PA EQ. Roland SEQ-331 1/3-octave graphics were provided for monitor system EQ; 2 Brooke-Siren FDS 360 crossovers, a Symetrix 501 limiter, and a Yamaha SPX-90 digital effects processor completed the electronics package. I felt the system low-mids were a bit too hot, especially in the area of the crossover point. Despite the limited

house EQ, by carefully balancing the crossover outputs and using the graphics sparingly I was able to partially smooth out the PA. Barton's monitor speakers contained a single JBL 2225 15-inch woofer and a Renkus-Heinz 160L 2-inch compression driver on a Renkus-Heinz CD horn.

STAGE SET-UP

I now had my chance to refine the techniques I'd use to project the All-Stars sound. Mic'ing at the Maidment was not indicative of what I'd do the rest of the tour; I would use as many as 6 mics on the drums down the road. For the most part, however, we went with

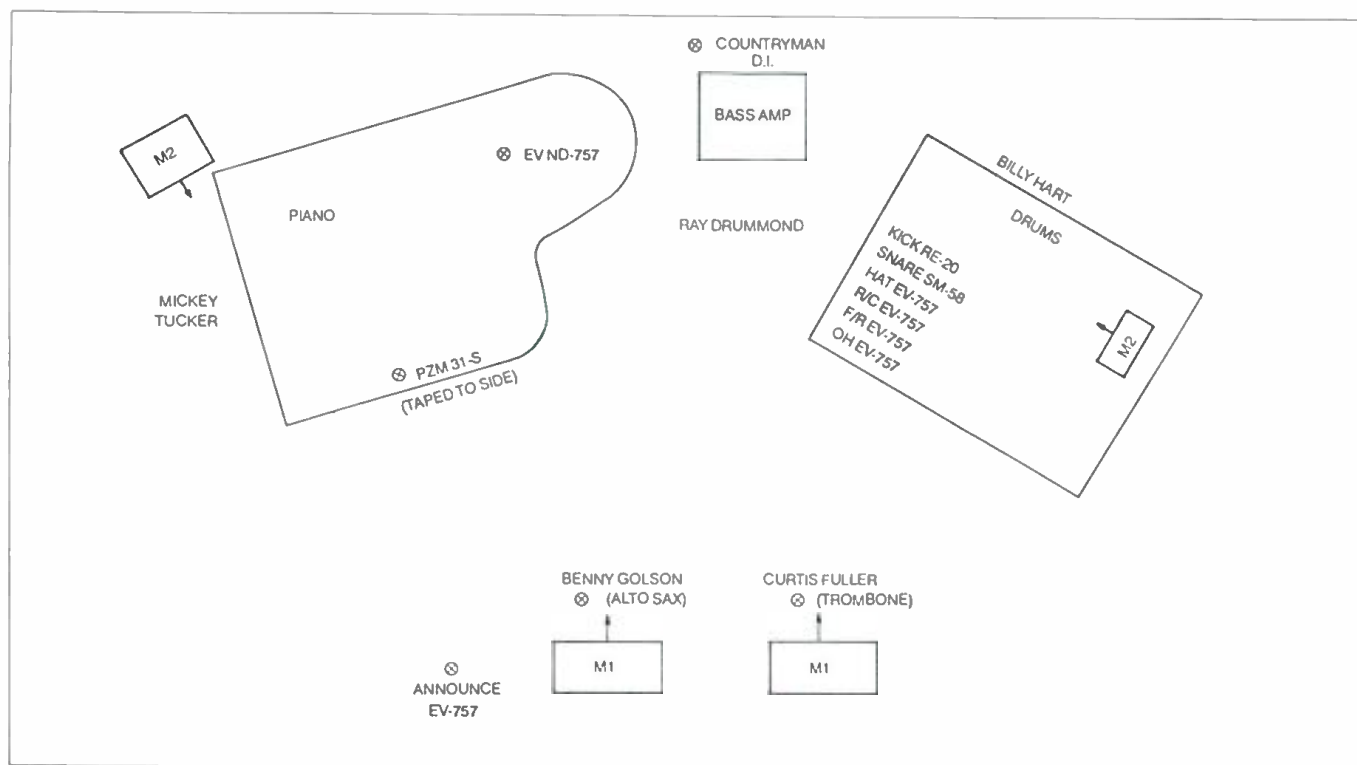*Figure 4. A Barton Sound 3-way cabinet.*
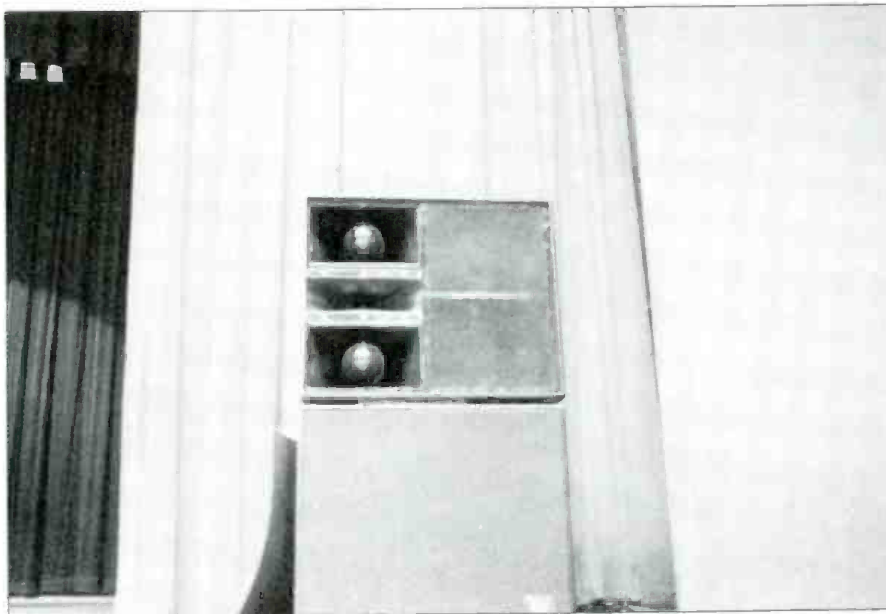
Figure 5. Stage setup at the Maidment Theatre.

one particular setup (*Figure 5*). Both Benny and Curtis used clip-on condenser mics of the Sony ECM variety. These were attached to the bell of each horn, with the wires run into a belt-pack worn on their waists. In addition to providing battery power for the mics, the belt-packs also provided level and tone controls. Since frequent adjustments during performance could cause detrimental effects (ie, feedback in the monitors), I worked with Benny and Curtis to get the optimum settings, then marked these with tape. We worked it out so that the only thing they ever did was turn themselves off when they didn't play on a particular number. These mics tended to be a little bright, and both Benny and Curtis wanted me to roll off substantial amounts of high end. Benny liked a 10 dB shelf cut at 2 kHz, which was quite a bit. I soon discovered the method to their madness: when both horns played together, the blend formed a lush, round sound that was never too brash. Curtis even went so far as to use a special foam "sock," which slid over his bell to absorb high frequencies. Of course, the real secret to the lush Fuller sound was: Curtis! As the tour continued, I was constantly amazed by the facility and "swing" of his playing. I set up an E-V ND-757 as an announce mic for Benny and Curtis; it doubled as a backup for the horns, should one of the condensers die during a performance.

Pianist Mickey Tucker proved to be a musician of unusual versatility. Besides the jazz compositions, he was also featured nightly on a boogie-woogie number and a modern classical piece. We had been assured by USIA that grand pianos could be procured at every stop along the tour. I mic'd the piano with an E-V ND-757 on the lows and a Crown PZM 31-S on the highs. The 757 was placed at the point where the low and mid strings cross, pointing slightly toward the hammers; the PZM was taped to a foam pad and affixed to the side of the piano, in the vicinity of the high-end strings, near the 3rd or 4th soundhole. The piano lid was always placed on the short stick: this allowed me to get the piano loud enough in the monitors, yet still give the sound some "air," avoiding the boxiness caused by a completely closed lid. When Mickey played his solo classical piece, I would substantially reduce the volume of the PA to create a more intimate mood. If the hall was small enough, I turned the PA off entirely; I did this at the Maidment with great effect.

Ray Drummond used a French-made contrabass carried in a Kolstein hard bass case. Barcus-Berry pickups were mounted on the instrument, and he carried his own Bose 800 speaker and Walter-Woods amplifier for stage amplification. His amp had been modified with a special power supply, switchable to either 120 or 240 volts,

using a standard U.S.-type Edison plug for a.c. input. Although I had a DI box with me, I elected to use Ray's personal Countryman passive DI box, which we ran off the line output of the Walter-Woods. This signal was so rich and clean that I never had to do much EQ, just turn it up. Ray's sound was truly self-contained, and he proved nightly that he deserved his reputation as one of the top young bassists in jazz.

GREAT DRUM SOUND

It's an added pleasure when you work for an artist who is also your good friend. Billy Hart and I had worked together on many previous occasions, and we were delighted to be reunited again on such an interesting tour. Billy's small Pearl set was comprised of an 18x14-inch bass drum, a 5x14-inch snare, 8x10-inch and 10x12-inch mounted toms, and a 14x14-inch floor tom. He still used his Istanbul cymbals that gave the gorgeous, clear highs. While the number of mics used changed from venue to venue, the type of mic used in each place remained the same. An E-V RE-20, with its large diaphragm, was the perfect choice for bass drum. Unlike many of today's drummers, Billy used both heads on, with no hole cut in the front. I placed the mic off-center, 2 to 4 inches away from the front head. A Shure SM-58 handled the snare, with E-V ND-757s on the rack and floor toms. I used

tronics, a console, a monitor system, snake, and mic stands to make a go of it. Our sponsors were a bit nervous about this; they had been assured by the library that the in-house system would be adequate, which was certainly not the case. We would now have to piece something together at the last minute. Fortunately, Bill Hamer put me in touch with Ian Hull-Brown, owner/engineer of Golden Horn, a small local sound company. I gave Ian a quick description of what I needed, and he agreed to meet me back at the library around 2pm to set up. We then travelled to meet the band at the U.S. embassy, where we enjoyed a luncheon/reception hosted by the U.S. Ambassador and the jazz club.

LAST MINUTE ADDITIONS

I returned to the National Library that afternoon, met Ian, and completed our set-up. Ian's console was a Yamaha 1604, with 2 Yamaha GQ-2031 1/3-octave equalizers, 2 GC 2020B dual channel limiters, and a REV-7 reverb rounding out the house electronics complement. A Yamaha P-2250 amplifier provided monitor power for the 2 Yamaha S-20X and 2 S-250X speakers. Sound check proved that I was going to have a rough night: the drums were blasting against the back wall, and they were not mic'd! The only instruments I amplified were horns and piano, and with the PA full out I could not get enough level to get solos or important ensemble passages to cut through the murk of room sound. It was time to get drastic. After discussing our situation, Billy agreed to play most of the evening with brushes instead of sticks, and Benny eliminated the loudest numbers from the evening's program. I stood in the house and carefully balanced Ray's stage bass volume so it could "carry" the room at appropriate levels (*Figure* 7). It still proved to be one of "those" nights! We sold out the place, with extra folding chairs added to the rear and side aprons to handle the overflow crowd. This helped overall intelligibility, but I still had quite a few people come up to me and complain about the sound during the performance. All the comments were about turning down the drums, especially when Billy used his sticks. When I pointed out that the drums weren't mic'd, their criticism melted. Judging from audience response, the evening was a smashing success, but without the cooperation of Benny and the group in dealing with

the sonic situation, it could easily have been a disaster.

Tuesday involved another change of scene: we were off to the South Island of New Zealand, where we would play a Wednesday concert in Christchurch. Upon arrival, we were met by CAS Maggie Hillock and Steve Carpinter from the Christchurch Town Hall. Both were glad to see me again, and we spent the drive to our hotel discussing concert logistics. Steve informed me that our concert would be held at the James Hay Theater, the smaller of the two venues at the Town Hall. I'd worked the big hall on my previous tour, and experienced its live acoustics, so I was looking forward to the more intimate confines of the James Hay. After we'd checked into the hotel, Benny went off with Maggie to handle the obligatory media interviews. Branch PAO (Public Affairs Officer) Karl Stoltz took mercy on the sports-starved members of the All-Stars and escorted the rest of us to the only bar in town featuring U.S. football; yes, we watched Monday-night football on a Tuesday afternoon due to the time difference. Later we enjoyed a cocktail reception at the local American Center, hosted by Karl and Maggie. Some of us took Steve Carpinter up on his invitation to attend the evening's concert at the Town Hall, featuring bluesman Brownie McGhee. His performance was also at the James Hay, so I used the opportunity to talk to house sound tech Kerry Griffiths about our sound needs. We scheduled a 3:30pm sound check for Wednesday.

I left a bit early for Wednesday's sound check, arriving at the James Hay Theater to help supervise the set-up of sound gear; Billy and Ray accompanied me so they could get in some early playing. Kerry had everything ready; we had only to position it. The hall seated 990 with the orchestra pit closed and seats installed on it. There was a balcony, and acoustics were quite good; reverb time overall was around 1.5 seconds and there weren't any problems with harshness (*Figure* 8). The house PA system was a Renkus-Heinz SR-2 Smart System: one cabinet per side, each contained 2 15-inch woofers and a high frequency section. These were concealed halfway up the proscenium behind false grillwork. The console was a Soundcraft 200B, and I had dbx limiters, UREI 1/3-octave room filters, and a Roland reverb and DDL for electronics (*Figure* 9). The mix point was at

the extreme rear of the floor seating area, under the balcony overhang. This location proved to be the day's biggest problem: the direct sound from the PA could not be heard at the mix point. By walking toward the stage about 8 rows, I found a spot where I could get a true picture of PA mix balance. The snake had a few bad channels, which took a few minutes to check out, but other than that the sound check was painless. We only had about half a house for our evening show, but those in attendance welcomed the group with rapt attention and plenty of applause. Mickey Tucker's featured boogie-woogie number, "Jam and Boogie," was the hit of the evening.

OFF TO PENANG

Thursday, September 17, was a day of airline travel. We left Christchurch at 7am local time, flying 3-1/2 hours to Sydney, Australia. During our 5-hour layover there, Arlene and I checked to ensure that all our baggage and equipment had been transferred to our connection. The flight to Kuala Lumpur, Malaysia, was a 7-1/2 hour one, which involved crossing Australia and making a stop in Jakarta, Indonesia. While traversing the Indonesian island of Java, we were treated to spectacular views of the volcanos around Surabaya. We finally arrived in Kuala Lumpur around 10pm, tired from our long day of travel. We were met by Information Officer Mary Gilroy and CAS Sharifah Zuriah Aljeffri. While we waited for our baggage, Sharifah and I discussed details. My sound gear had arrived last week, and had been shipped, via truck, to Penang, where we would link up with it tomorrow. She also had a list of sound equipment available at the hotel where we would play our Saturday concert. I picked the stuff I wanted, and she agreed to phone the hotel and have the desired gear prepared for me. Because we were only spending one night in KL before flying to Penang, USIA had reservations for us at the airport hotel, which was literally across the street from our terminal. In a flash, we were resting at the hotel, with our gear stashed in the hotel luggage room. Our flight for Penang wouldn't leave until 2pm Friday, so we had some time to recuperate from our long and tiring Thursday of travel.

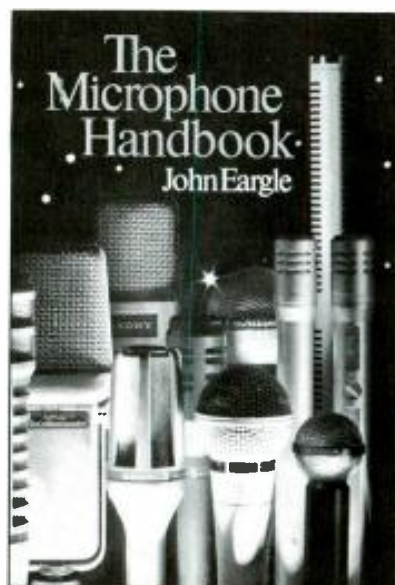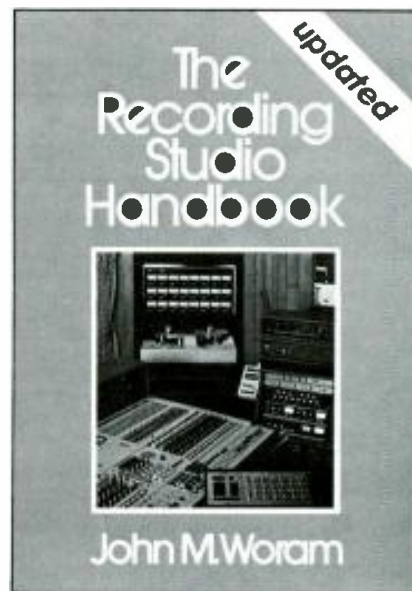NEXT ISSUE: The tour continues, as we give performances in Malaysia, Singapore, Indonesia and Burma. **db**

BRUCE BARTLETT

Recording Techniques

SYNCHRONIZING A DRUM MACHINE TO A SYNTHESIZER

● In our July/August issue, I explained how to connect a synthesizer to a computer MIDI interface to make a simple MIDI studio. The next step is to add a drum machine.

Suppose you've recorded a drum pattern using the drum machine's internal sequencer (it's easier to do this than recording the pattern on several tracks of an external sequencer). Also suppose you've recorded a synthesizer melody with an external sequencer. How do you synchronize the drum patterns in the drum machine with the synthesizer melody in the sequencer? In other words, how do you get the drum machine and synth to play in sync, when both have different patterns recorded in different memories?

To synchronize the machines, you use a single MIDI clock (timing reference) that sets a common tempo for all the equipment. Before setting up a system to do this, first we need to understand what the MIDI clock is.

WHAT IS THE MIDI CLOCK?

The MIDI clock is a series of bytes in the MIDI data stream that conveys timing information. It is analogous to a conductor's baton movements, which keep all the performers in sync at the same tempo. The clock bytes are added to the MIDI performance information in the MIDI signal. The clock signal is 24, 48, or 96 pulses per quarter note (PPQ). That is, for every quarter note of the performance, 24 or more clock pulses (bytes) are sent in the MIDI data stream.

A sequencer or drum machine can do the following with the clock pulses:

1. Send clock pulses from its MIDI OUT connector.

2. Receive clock pulses at its MIDI IN connector.

3. Echo (repeat) incoming clock pulses through the MIDI THRU connector.

If a drum machine sends clock pulses, the drum machine sets the tempo and other devices follow it. If a drum machine receives clock pulses from a sequencer, the sequencer sets the tempo and the drum machine follows it.

To send clock pulses from a sequencer or drum machine, you set the device to "Internal clock" mode. To receive clock pulses, you set it to "External clock" or "MIDI clock" mode. Transmitting a clock pulse through the MIDI THRU connector is automatic. If your drum machine has only a MIDI OUT connector, you enable "Echo MIDI in" so that the incoming pulses are echoed or repeated at the MIDI OUT connector.

Now that you understand the MIDI clock, you're ready to use it to synchronize a drum machine with a synthe-sizer. Let's say that each has a separate recorded performance stored in its own memory. The audio outputs of the drum machine and synth are connected to a mixer, which you monitor. There are at least three ways to synchronize the recorded drum performance with the recorded synth performance:

1. Use the drum machine's clock to drive the sequencer, which in turn drives the synthesizer in sync with the drum machine.

2. Use the sequencer's clock to drive both the drum machine and the synthesizer. The drum machine's internally recorded patterns play in sync with the synthesizer's sequencer-recorded melody.

3. Record the drum-machine pattern on one track of the sequencer; record the synth melody on another track of the sequencer. During playback, the sequencer clock will drive both the drum machine and synthesizer.

Let's look at each method in detail.

METHOD 1: MAKE THE DRUM MACHINE CONTROL THE SEQUENCER

Please see *Figure 1* for this setup. The connections to a sequencer are either to a stand-alone unit, or to a MIDI computer interface plugged into a computer running a sequencer program. You would proceed as follows:

1. Record a drum pattern with the drum machine's internal sequencer.

2. Record a synth melody or chords with an external computer/sequencer.

3. Connect the drum machine MIDI OUT to the sequencer MIDI IN.

4. Connect the sequencer MIDI OUT to the synthesizer MIDI IN.

5. Set the drum machine to ENABLE CLOCK OUT (or equivalent).

6. Set the sequencer to EXTERNAL CLOCK or MIDI CLOCK.

Figure 1 Equipment connections for making the drum machine control the sequencer.
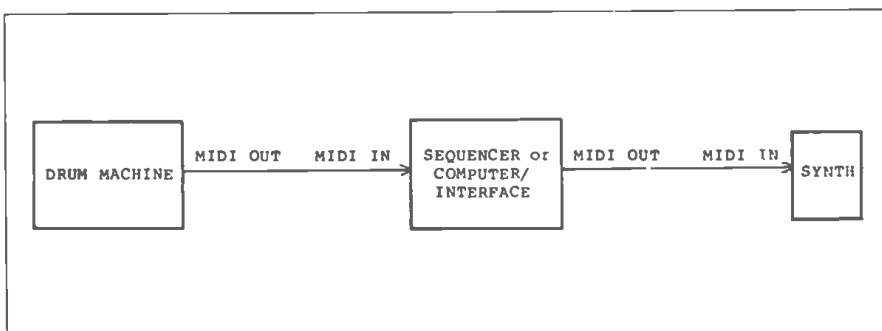
7. Press the "play" key on the computer/sequencer.

8. Press the "play" key on the drum machine.

As the drum machine plays its internally recorded patterns, its clock pulses drive the sequencer to play the synth melody at the same tempo.

Figure 2. Equipment connections to make the sequencer drive the drum machine and the synthesizer.

METHOD 2: MAKE THE SEQUENCER PLAY THE DRUM MACHINE AND SYNTH

Please refer to *Figure 2* for this setup. You would proceed as follows:

1. Record a drum pattern with the drum machine's internal sequencer.

2. Record a synth melody or chords with an external computer/sequencer.

3. Connect the sequencer MIDI OUT to the drum machine MIDI IN.

4. Connect the drum machine MIDI THRU to the synth MIDI IN. Alternatively, set the drum machine to echo the MIDI IN signal to the MIDI OUT connector, and connect the drum machine MIDI OUT to the synth MIDI IN.

5. Set the drum machine to receive an EXTERNAL CLOCK or MIDI CLOCK signal.

6. Set the sequencer to INTERNAL CLOCK and MIDI DRUM.

7. Set the drum machine to MIDI channel 1. Set the sequencer synth track and the synthesizer to MIDI channel 2. In this way, the sequencer's recorded performance will play only the synthesizer. Alternatively, keep everything on MIDI channel 1, but set the drum machine so that it will NOT respond to MIDI data.

8. Press the "play" key on the computer/sequencer.

As the sequencer plays its recorded synth melody, the sequencer's clock pulses drive the drum machine and synthesizer at the same tempo. The drum machine plays its internally recorded patterns, while the synth plays the sequencer track.

METHOD 3: RECORD THE DRUM PATTERNS INTO THE SEQUENCER

Please refer to *Figure 3A* for this setup. You would proceed as follows:

1. Record a drum pattern with the drum machine's internal sequencer.

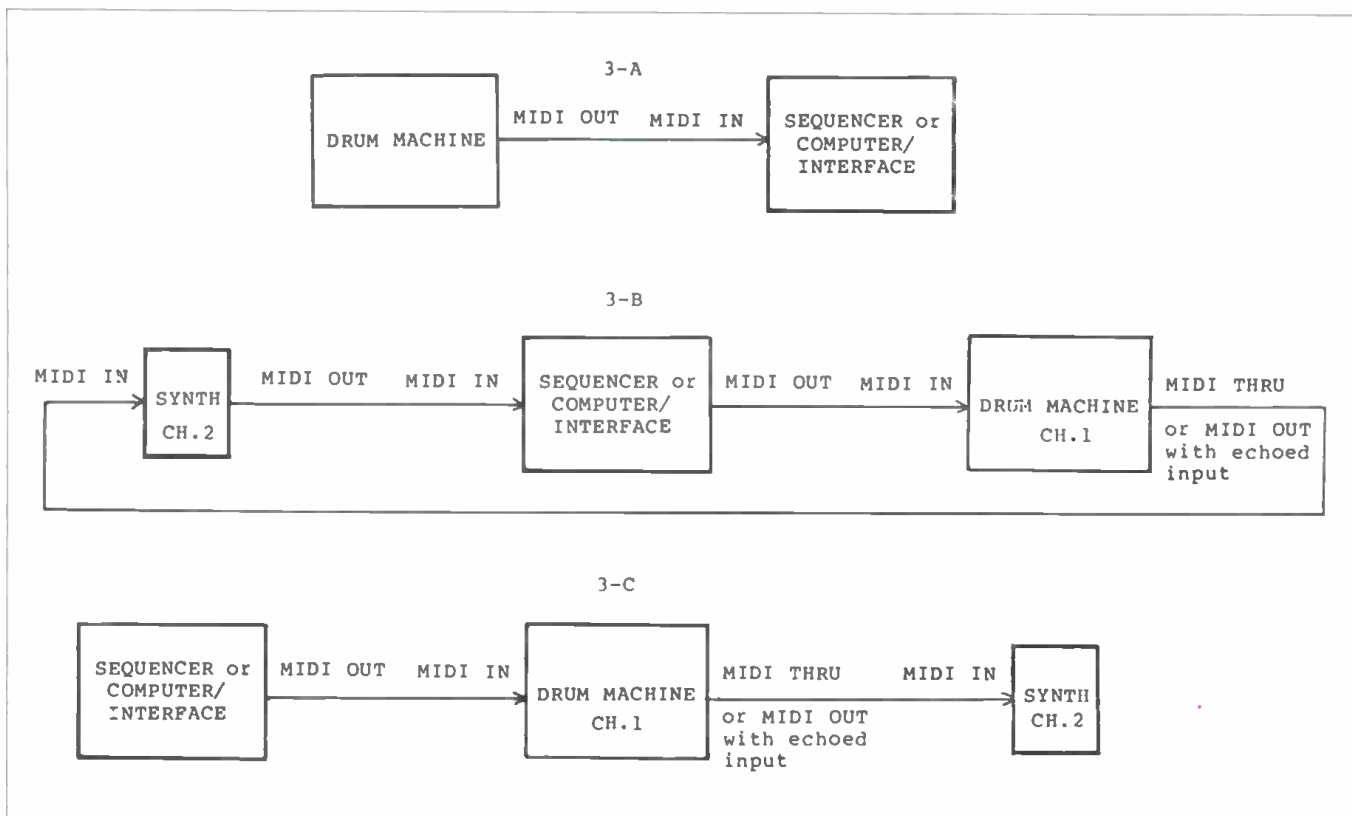2. Connect the drum machine MIDI OUT to the sequencer MIDI IN.

3. Set the drum machine to ENABLE CLOCK OUT (or equivalent).

Also set the drum machine to enable MIDI data out, or to send MIDI data.

4. Set the sequencer to EXTERNAL CLOCK or MIDI CLOCK mode, and record track 1.

5. Hit the "play" key on the drum machine. The sequencer will record the drum pattern on track 1.

Figure 3. Equipment connections for recording the drum patterns into the sequencer on track 1 (3A), overdubbing the synthesizer into the sequencer on track 2 (3B), and playing both tracks into the drum machine and synthesizer (3C).
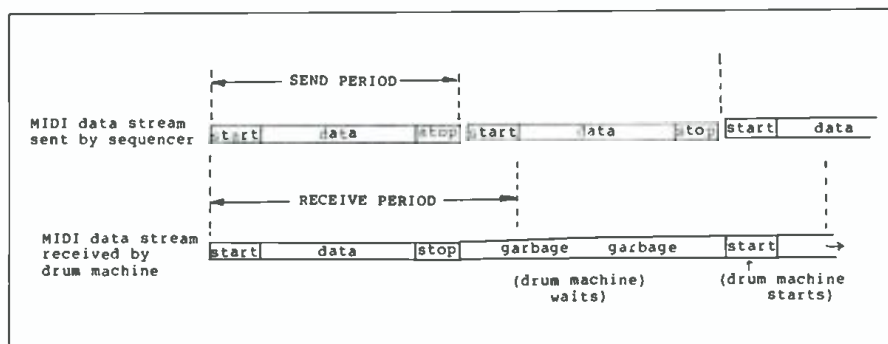
Figure 4. The effect of mismatched baud rates.

6. Now you're ready to add the synthesizer track. Connect the sequencer MIDI OUT to the drum machine MIDI IN (as in *Figure 3B*).

7. Connect the synthesizer MIDI OUT to the sequencer MIDI IN.

8. Set the sequencer to INTERNAL CLOCK.

9. Start recording on track 2 with the sequencer. You'll hear the drum machine playing the pattern recorded on track 1.

10. While listening to the drum machine, play along on the synthesizer and record it on track 2 of the sequencer.

11. For playback, connect the sequencer MIDI OUT to the drum machine MIDI IN (as in *Figure 3C*).

12. Connect the drum machine MIDI THRU to the synth MIDI IN. Alternatively, enable the drum machine to echo the MIDI IN signal at its MIDI OUT connector, and connect the drum machine MIDI OUT to the synth MIDI IN.

13. Set sequencer track 1 to MIDI channel 1; set sequencer track 2 to MIDI channel 2.

14. Set the drum machine to receive MIDI signals on channel 1. Set the synth to receive MIDI signals on channel 2.

15. Press the "play" key on the computer/sequencer.

As the sequencer plays tracks 1 and 2 on channels 1 and 2, its clock pulses drive the drum machine and synth at the same tempo.

Synchronization problems might occur with Methods 1 and 2. If the baud rate of the computer is faster than that of the drum machine, the drum machine might gradually lag behind the sequencer playback tempo. Here's why:

In most drum machines and synthesizers, the computer clock frequency yields a correct MIDI baud rate of exactly 31,250 bits per second. But in the Commodore 64 and Apple II series computers, the computer clock frequency is slightly higher, so these computers send MIDI data at 31,960 baud—slightly faster than the standard MIDI baud rate. However, the drum machine and synth are designed to receive MIDI data at exactly 31,250 bits per second. Herein lies the problem.

Each MIDI byte has 10 bits: a start bit, an 8-bit word, and a stop bit. Since the computer is sending MIDI bytes slightly faster than the drum machine is receiving them, the drum machine eventually misses a start bit (*Figure 4*). Instead, it just sees garbage, and waits until it sees the next start bit to continue playing. This "waiting" causes the drum machine to gradually lag behind the sequencer tempo. That is, the drum machine starts in sync with the sequencer, but since the drum machine is playing slightly slower, it gradually lags behind or plays late.

Some synths can accommodate incorrect baud rates better than others. If the synth can follow the sequencer's incorrect baud rate, but the drum machine lags behind the sequencer's baud rate, eventually the drum pattern will lag behind the synth melody.

There are several solutions to this problem:

- Obtain a MIDI computer interface with a built-in crystal oscillator. The baud rate will be determined by that crystal rather than by the computer's crystal. Many recent interfaces have a crystal oscillator built in.

- Use a computer other than Apple II series or Commodore 64.

- Add a crystal oscillator and divider to an existing MIDI computer interface to get 31,250 baud.

- Use Method 3 described earlier: record a short drum pattern into a sequencer, then play along with it on your synth while recording the synth on another sequencer track. Since the drum pattern is short, long-term time-lag problems don't happen.

EFFECTS OF TRANSPOSING

Suppose you have recorded a synth track and a drum-machine track with a single sequencer. If you transpose a song section (change its key), the sequencer will play different keyboard keys to transpose the melody. Unfortunately, the sequencer will also play different drum-machine pads. Instead of hearing, say, a kick drum, you'll hear a cowbell. To prevent this, transpose only the synth track—not the entire sequence which contains both drum and synth tracks. Append together various sequences, each sequence having a synth track with different keys (pitches).

EFFECT OF TEMPO CHANGES

If you change the tempo of a sequence, both the drum machine and synth will follow the change, and stay in sync. No problem.

If the sequencer is playing at 96 PPQ, but the drum machine operates only at 24 PPQ, the drum patterns will play four times too fast. Be sure that the sequencer and drum machine are set to the same PPQ rate.

A REAL-WORLD EXAMPLE

The first time I tried synching a drum machine to a synthesizer, I used an Alesis drum machine, Casio CZ-1000 synthesizer, Passport MIDI interface, and a Commodore 64 computer running a Syntech Studio 1 sequencer program.

To begin the process of songwriting, I recorded the intro by tapping in a four-bar solo on the drum machine.

I started with kick and snare, then added hi hat, toms, and cymbals. Then I recorded another simple four-bar drum pattern to be used throughout the song. Now there were two drum patterns in the drum machine's internal sequencer.

Next, I recorded synthesizer chords into the computer/ sequencer while listening to the sequencer's click track. When I was finished, the sequencer contained the synth performance.

Now I was ready to sync the two sequences: drums and synthesizer. I tried method one, driving the

sequencer and synth from the drum machine. Although they started together when I hit "play" on the drum machine, the drums eventually lagged behind the synthesizer. Unknown to me, the slight difference in baud rate between the Commodore 64 and the Alesis drum machine caused the problem.

Next I tried method two, driving the drum machine and synth from the sequencer. The same problem occurred.

Finally I tried method three, which worked. I recorded the drum intro into the sequencer as sequence A, track 1. Then I recorded the four-bar simple drum pattern as sequence B, track 1. While listening to the sequence-B drum track, I played four bars of synthesizer chords, and recorded them on track 2.

THE RIGHT TIME

Now it was time to put the song together. I copied sequence B several times and appended it onto itself, calling each copy "sequence C," "sequence D," etc. For each of these sequences, I transposed the synth track to a different key. This resulted in chord changes. Finally, I cut and pasted the various sequences (chord changes) together, plus the intro, to form a song.

To make sure each track played the correct instrument, I set track 1 and the drum machine to MIDI channel 1, and set track 2 and the synth to MIDI channel 2. I plugged the sequencer MIDI OUT to the drum machine's MIDI IN, and plugged the drum machine's MIDI OUT (with input echoed) to the synth's MIDI IN. Finally, I hit "play" on the sequencer, and a tightly synchronized song came out.

I recorded the drum machine and synth audio outputs onto three tracks of a multi-track tape recorder (two tracks for the stereo drum machine). Then I overdubbed a synthesizer melody, and mixed down the four tracks with effects to stereo. There's another way to do this: Record a sync tone on an outside track of a multi-track recorder, and drive the drum machine and synth chord sequence from the tape-sync signal. Then you can record the audio outputs of the drum machine and synth directly onto 2-track for better clarity.

It might have been easier to make the drum machine play its patterns, play along "live" on the synth, and record an audio mix of the two instruments. But at least I learned how to make two non-compatible machines play together. This achievement was technical mastery, more than musical mastery. The pleasure of creating a song this way was intellectual, rather than physical or emotional. Whether or not the mechanical assembly of a song can be called "song writing" is debatable, but some sort of music did come out of the playback speakers!

CONCLUSION

By following the suggestions in this article, you should be able to synchronize a drum machine with a synthesizer. These principles can be extended to more tracks and more sound generators as you expand your MIDI studio. Be aware of computer incompatibility problems and work around them. You'll be rewarded with a well-synchronized musical performance.
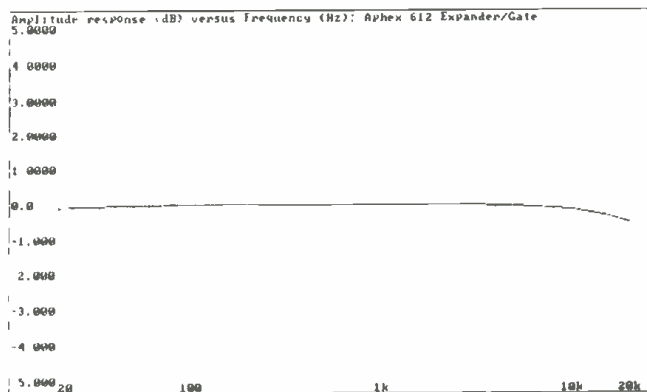
Figure 2. Frequency response with low-pass and high-pass filters out of the circuit. Input level was set at +4 dBm.

Figure 3. Typical action of low-cut filters. Low cut range extends from 30 Hz to 3 kHz; high cut range is from 150 Hz to 15 kHz . Both filters have rated slopes of 12 dB/octave.

phones in PA systems, increasing the dynamic range of noisy communications systems and in a host of other applications that will probably occur to the user who opts for one or more of these well designed units.

The Model 612 has two identical channels of gain control that can be used independently, or linked together with a "Master/Slave" switch, or with some external circuitry to provide an appropriate control signal. The two channels, though not linked together for stereo operation (except in "ducking" applications that we'll describe later). Expansion of gating is not generally applied to stereo program material; it is more common to process independent channels individually. For true stereo operation, a mono side-chain signal must be derived from the two separate input signals, with a level corresponding to the loudest of the two input channels.

As Aphex points out in their comprehensive owner's manual, simple gates have little or no control over the attack and decay characteristics of the control signal. Most have only a threshold control that determines the minimum level of input signal required to turn the device on. The Model 612, by contrast, is equipped with a full complement of controls by means of which you can adjust attack time, release time, hold time, expansion ratio, and range of attenuation. We'll discuss the precise function of each of these controls shortly.

The side-chain of each channel can be processed by adjustable low and high-cut filters. The side-chain can also be patched to external processors, using sidechain input and output jacks found on the rear panel of the instrument. Side-chain signals can be monitored by switching them into the audio output circuit. The filters provided in each channel are particularly useful for tailoring the frequency response of the side-chain to selectively eliminate frequencies that cause unwanted triggering of the expander. Aphex cites a good example that will be familiar to most recording engineers. Suppose, in processing a snare drum track, leakage from the high-hat or cymbals tend to trigger the expander circuits. By setting the filter so that only the lower frequencies from the snare drum itself come through in the side-chain, this problem is easily eliminated with the Aphex 612.

While a single channel gate/expander can be put to good use in many applications, a two-channel unit that can be linked to a common control signal, such as this one can offer even more applications. The "Master/Slave" switch of the 612 replaces the control signal in Channel Two with the control signal from Channel One. An example of using the unit
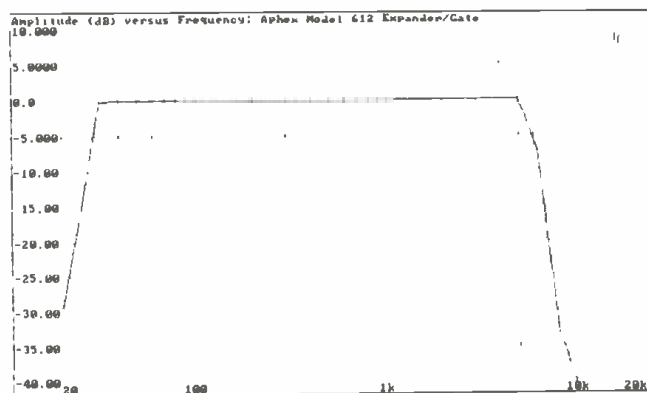
this way might be in the course of music recording, one channel can be used on a bass drum track to eliminate leakage from other drums, while the other channel, triggered by the control circuits of the first channel can be used to process a bass guitar track, synchronizing the bass guitar to the bass drum.
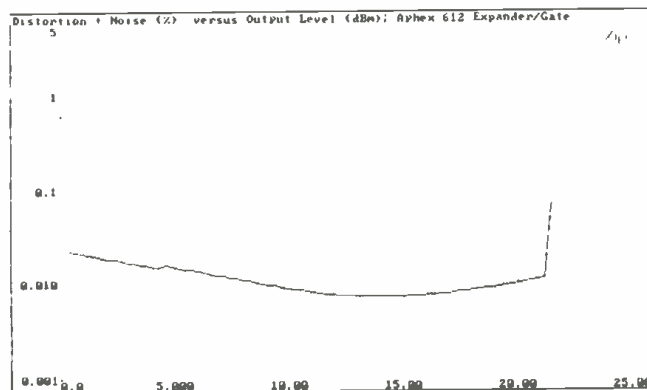
The heart of any high quality gate/expander is the voltage controlled attenuator, or VCAtt. In an expander/gate device, the VCAtt must have excellent rejection of the control signal in the audio output to eliminate any clicks or pops during its operation. The first thing we noticed about the Model 612 (as compared with any other such gating or expansion devices) was its ability to operate without degrading the audio signal and without introducing any noticeable clicks or pops regardless of attack speed, degree of expansion, or any other adjustable parameters.

CONTROLS

To fully appreciate the versatility and flexibility of the Aphex 612, it's necessary to discuss the functions of each of its many front panel controls. All of these controls, incidentally, are duplicated for each channel, except the common "Master/Slave" switch mentioned earlier. If you follow the block diagram of Figure 1 as you read the control descriptions, you will see how and where each control fits into the total signal path.

The main power on/off rocker switch at the right of the panel turns on the unit, which can be operated at either 100-120 Volts or 200-240 Volts AC. Under normal operation, the

Figure 4. Harmonic distortion plus noise versus output per channel at 600 ohm loads and 1 kHz.

Figure 5. Harmonic distortion plus noise versus frequency, at a constant regulated output level of +10 dBm.

Figure 6. SMPTE-IM distortion versus output level.

612 consumes only about 20 watts of power. The Master/Slave switch is located just above the power switch and to its left.

As for the switches, controls and indicators that are common to both channels, at the left are the low-cut and high-cut filter range controls, while above them is the filters on/off pushbuttons and an associated indicator light. Range of cut-off frequencies for the low-cut filter is from 30 Hz to 3 kHz, while for the high cut filter, cut-off can be set anywhere from 150 Hz to 15 kHz. Further along to the right is one of the most important controls, the Threshold Control that can be set at any level from –50 dBm to +20 dBm. Three LED displays above this control show the status of the channel, whether the gate is above threshold (open), holding, or below threshold (closed.) An "In/Out" button allows each channel to be completely bypassed.

An attack time control, variable from a minimum of 2 μsec to 100 msec comes next, followed by a "Hold" control that allows programmed delays of from 10 msec to 4 sec before the release function of the gate is activated. A release "Time" control comes next and has a range of from 40 mSec to 4 Sec. The next control, labeled "Ratio", determines the ratio of downward expansion from a low ratio of 1.2:1 through low ratios for accentuating musical dynamics, all the way to 30:1 for true gating.

The "Range" control found alongside the Ratio control sets the amount of expansion from 0 to a full 100 dB. There are three more small pushbuttons arranged above the last-named rotary controls. A button labeled "Key-Ext" allows the use of a rear panel jack input to the key circuits so that the 612 can be controlled from an external source. A "Key Listen" pushbutton switch switches the key signal to the main output so that adjustments of the filters and key controls can be made more easily.

Finally, a "Ducking" switch completes the front panel layout of each channel. In the broadcast industry it is common to "duck" or attenuate a channel during a voice-over announcement. In the Model 612 this function can be performed automatically. The voice channel is used as the key signal, fed to the Key Input jack, and it triggers attenuation in the main audio channel. Other applications of this mode will surely occur to you once you've had an opportunity to play with the 612.

The rear panel of the 612 is equipped with XLR-type input and output connectors for each channel, as well as standard 1/4-inch "In" (key) and "Out" phone jacks for the sidechain.
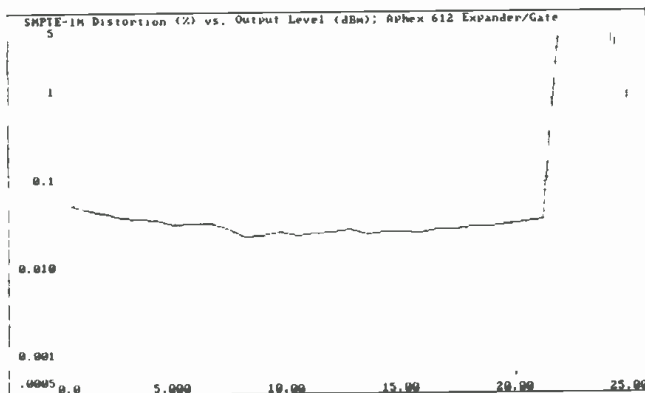
The main line fuse is easily accessible at the rear panel and is located adjacent to the 3-prong (grounded) AC line receptacle. A separate heavy-duty line cord is supplied with the unit so that suitable operating voltage can be selected depending upon the country in which the 612 is to be used.

LAB MEASUREMENTS

It was clear to us at the outset that steady-state test signals applied to the Aphex 612 would not fully reveal its excellent performance under real-world music and speech signals. After all, such tests cannot easily determine attack time, release time, and absence (or presence) of sonic artifacts caused by the gating or expansion action. Nevertheless, such tests, we feel, are important since, when the signal does pass through the 612 (whether expanded or not, and whether attenuated or not) you don't want this signal processor to degrade the original, unprocessed signal in any way. So, we conducted several tests using steady-state signals much as we would, say, for a mixer or a line-level preamplifier. We the augmented those tests by hooking up the Aphex 612 in the signal path of our own reference music reproducing system.

Figure 2 is a plot of frequency response from 20 Hz to 20,000 Hz. The vertical scale is rather expanded to enable you to see even slight deviations from flat response. At 20 Hz, response was virtually flat, while at 20 kHz, response was down an insignificant –0.5 dB. Next, we introduced the "key" low-cut and high cut filters, setting them to nominal points that we later learned corresponded to cut-offs at 32 Hz and 5.3 kHz. Surprisingly, as shown in *Figure 3*, the filters were much sharper than specified.

Though Aphex rates the slopes of these filters as 12 dB/octave, the curves plotted would seem to indicate a slope more like 18 dB per octave or perhaps even higher. Next, we plotted harmonic distortion plus noise versus output level per channel, with the output connectors terminated in 600 ohm loads, using a test signal of 1 kHz. Note that this plot, shown as *Figure 4* was of THD plus noise, not THD alone. This accounts for the apparent rise in the plot at lower output levels. If we discount the noise contribution, THD (as plotted between about 12 dBm and 15 dBm) was very low, reading approximately 0.007 percent. This test also confirmed the maximum output level available before clipping as being somewhat higher than the 21 dBm claimed by Aphex.

We obtained excellent correlation with *Figure 4* when we plotted distortion plus noise versus frequency for an output level of +10 dBm, shown in *Figure 5*. THD plus noise remained at or below 0.01 percent for frequencies from 20 Hz to 3 kHz and even at 10 kHz, THD + noise did not go beyond 0.013 percent.

Our final "bench test" graphic plot using steady-state signals was a test of SMPTE-IM distortion versus output level. Results are shown in *Figure 6*. Again, output levels of well over 21 dBm were easily accommodated, and at +10 dBm, SMPTE-IM measured just over 0.02 percent. Static tests of signal-to-noise ratio were also made. At unity gain, referenced to +4 dBm input and output, the A-weighted signal-to-noise ratio of the Aphex 612 measured exactly 87 dB, as specified by Aphex in their literature. With the unit fully off (no expansion or gating action), S/N increased to 95 dB, or 1 dB better than claimed.

Maximum attenuation of a signal below threshold, with the expansion control set to maximum, measured a full 82.0 dB. With that kind of gating action, listeners are not likely to hear any residual sounds from any source that you have gated to the "off" status using this equipment!

All of our measurements are tabulated and compared with Aphex's published specifications in the Vital Statistics table at the end of this report. As for listening tests, we were truly amazed at the transparency afforded by this Gate/Expander. Even when we set the attack time to its minimum, there was no evidence of clicks or pops as the gate opened or closed at this high speed. One word of caution is in order, here. The very flexibility and the number of controls available on each channel with the Aphex 612 means that it is relatively easy to incorrectly adjust the system so that it will not perform at its best. We would suggest that the owner's manual be read carefully and that you spend a fair amount of time familiarizing yourself with all of the controls and with each one's effect upon the final signal.

With proper use, we were able, for example, to reduce unwanted background hiss and noise from an old tape recording that we had made many years ago and from weak signal FM broadcasts that we passed through the Aphex 612. On the other hand, when the unit was incorrectly adjusted during some of our earlier experiments, we were able to make the system sound as if someone were rather violently "riding gain" on a master volume control somewhere. Overall, though, we concluded that Aphex engineers have created a fine, flexible instrument that should find applications in a wide variety of professional audio environments. The wide dynamic range of the instrument makes it suitable for processing virtually any audio program source—including digital program sources.   db

VITAL STATISTICS

SPECIFICATION	MFR'S CLAIM	dB MEASURED
Input impedance	80K ohms	Confirmed
Nominal Operating Level	+4 dBm	Confirmed
Maximum Input Level	+21 dBm	+21.5 dBm
Key Input Impedance	200K ohms	Confirmed
Maximum Key Level	+21 dBm	+22 dBm
Output Impedance	65 ohms, Balanced	Confirmed
Maximum Output Level	21 dBm	+22 dBm
Frequency Response ±0.5 dB	N/A	20 Hz to 20 kHz
Bandwidth	5 Hz to 100 kHz	N/A
THD @ +20 dBm	0.006%	0.01%
SMPTE-IM @ +10 dBm	0.006%	0.025%
Noise & Hum, Unity Gain	−87 dB	−87 dB
Noise & Hum, fully off	−94 dB	−95 dB
Crosstalk (worst case)	−76 dB	−79 dB
Maximum gate attenuation	N/A	−82 dB
Dimensions (HxWxD, inches)	1-3/4x19x9	Confirmed
Weight	7 lbs.	Confirmed
Price	$795.00	

1989 Editorial Calendar

JAN/FEB........................... db Looks at the Electronic Cottage going upscale!

A broadcast report on the Seoul Olympics

● GUIDE: Speakers: performance & monitor

MAR/APR........................... db Looks at the Sound Reinforcement Scene: theory,

layout, and construction

● GUIDE: Power Amplifiers

MAY/JUNE.......................... db Looks at The Windy City

● GUIDE: Consoles & Mixers

JULY/AUG .... db goes on tour with the Major Touring

companies

● GUIDE: Tape, tape recorders and accessories

Microphones

SEPT/OCT.......................... db looks at the Boston Recording Scene

● GUIDE: Signal Processing Equipment, Part I

NOV/DEC........................... db Looks at The West Coast & Hawaii

● GUIDE: Signal Processing Equipment, Part II

Studio Accessories

Signal Processing

On the pages that follow, we present this issue's Buyer's Guide on signal processing equipment. The information contained is supplied by the respective manufacturers. Further, if a manufacturer that you seek is not listed, the chances are strong that, as many times as we tried, we could not get information from them.

COMPRESSOR/LIMITERS/GATES/NOISE CONTROLLERS

ALESIS
Micro Limiter is a professional quality, full stereo, soft-kneed limiter/compressor with unique attack and decay characteristics. The preset attack rate is dependent upon the nature of the input signal; it adjusts automatically to compensate for large peaks while maintaining a consistent signal level. Other features include a 1/3 rack space interlocking extruded aluminum case, INPUT, MIX, and OUTPUT controls, as well as in/out switch and 20 kHz bandwidth.

Price:

$125.00

Micro Gate is a keyable stereo in, stereo out noise gate with THRESHOLD, DELAY and RATE controls. Features include smooth, quiet operation, 20 kHz bandwidth, IN/OUT switch, and a 1/3 rack space interlocking extruded aluminum case.

Price:

$125.00

ALTEC LANSING CORPORATION
1712A compressor/limiter is electrically balanced with variable threshold from −45 to +20 dB, and a variable compression ratio from 1:1 to infinity:1. Features include variable output gain from −20 to +20 dB maximum compression at 60 dB and THD is less than 0.05 at 20 dB of compression. Dimensions are 1.75x19x9. Weight is 6.3 lbs.

Price:

$612.00

APHEX SYSTEMS LTD.   —See our ad on page 13 & 17
612 expander/gate is an audio dynamics processor using downward expansion with a variable ratio, this allowing an infinite variety of dynamics control that is click-less. Dimensions are 1.75x19x9. Weight is 7 lbs.

Price:

$795.00

ASHLY AUDIO INC.
CL-50 and CL-52 are useful for loudspeaker protection, broadcast limiting and compression, recording, tape-to-disc transfer, special effects, vocal level control, and musical instrument sustain. Features include extremely low noise and distortion, detector patch points for frequency selective limiting, gain reduction meters, in/out bypass switching, balanced or unbalanced inputs and outputs. The CL-52 is essentially two CL-50s in one rack space but offers improved metering and switching.

Price:

$279.00 (50) and $479.00 (52)

SG-33 and SG-35 are 2 and 4-channel noise gates respectively. Features include fast (10 microsecond) attack time, 60 dB threshold range, stereo tie patch point for accurate tracking of two or more gates, balanced or unbalanced input operation, extremely low noise and distortion, in/out bypass switching, and two stage release circuit. Both units are useful for professional and semi-pro levels.

Price:

$399.00 (2-channel) and $599.00 (4-channel)

CG-85 gated compressor-limiter features independent attack, release and ratio adjustment. Other features include adjustable attack and release thresholds, 20 segment gain reduction indicator, 10 segment meter for input or output level, gated release function to minimize "breathing," distortion reducing release logic circuitry, dual time constant, and stereo tie and side chain patch points.

Price:

$379.00

DOD ELECTRONICS CORPORATION (AUDIO LOGIC)

R825 is a single channel compressor/limiter featuring a sophisticated de-essing circuit. It is linkable to another unit for stereo operation and allows access to the signal processing side chain.

Price:

$259.00

Audio Logic MT66 is a stereo compressor/limiter capable of "soft knee" dynamic range compression, or hard or soft limiting from 1:1 to infinity:1, with up to 25 dB of gain reduction, and includes accessible side chains and a noise gate on each channel.

Price:

$320.00

Audio Logic MT44 is a four channel noise gate in a single rack unit space. Release time, threshold, and range parameters are user controllable. Each gate has side chain access and keying ability.

Price:

$350.00

FURMAN SOUND, INC.

LC-X expander/compressor/limiter has three independently functional sections. Controls include three THRESHOLD, two RATIO, ATTACK, RELEASE, and OUTPUT. Features switchable LED meter, side chain jacks, bypass switch, DE-ESS button, stereo interconnect, and on/off transient muting. Optional balanced configuration. Dimensions are 1.75x19x8. Weight is 7 lbs.

Price:

$349.00

LC-6 stereo limiter/compressor/gate is a two channel unit that can be switched for stereo operation. Controls include INPUT, OUTPUT, COMPRESS THRESHOLD, GATE THRESHOLD, ATTACK, RELEASE, and RATIO. Includes LED meters and side chain jacks. Also offered is ground lift switch and optional balanced configuration. Dimensions are 1.75x19x8. Weight is 7 lbs.

Price:

$419.00

LC-3A is an economical compressor that includes input, output, attack, release, and ratio controls. Other features are LED meter to indicate gain reduction, overload and power indicators, side chain jacks, DE-ESS button, ground lift switch and optional balanced configuration. Dimensions are 1.75x19x8. Weight is 7 lbs.

Price:

$249.00

QN-4A quad noise gate has four identical, independent noise gate channels. Each features threshold, release, and depth controls, with CHANNEL ON indicator. Key input jacks are provided for special effects. Unit employs low distortion pulse-width modulation (150 kHz clock rate). Optional balanced configuration. Dimensions are 1.75x19x8. Weight is 7 lbs.

Price:

$399.00

JBL PROFESSIONAL

7110 limiter/compressor incorporates Smart-Slope compression ratios adjustable from 1.5:1 through infinity:1, and permits independent settings for limiting threshold, attack and release times, and output level. Unit has peak and/or average gain reduction. Dimensions are 1.75x19x8.5. Weight is 7.5 lbs.

Price:

$475.00

CLX-2 is a feed-forward compressor/limiter incorporating the Allison EGC-101 VCA. Features include simultaneous operation of both compressor and limiter.

Price:

$895.00

ACC-2 is similar to the CLX-2 but has a full-featured expander as well. Included is an outboard oscillator for tremolo and stereo panning.

Price:

$1,250.00

SK-2 is a stereo limiter/expander with features that include simultaneous limiting and expansion functions, de-essing, and stereo or independent operation.

Price:

$395.00

MITSUBISHI PRO AUDIO GROUP

CLEG-222 combines the functions of four devices in a 5.25-inch module that can be mounted in-line with a Westar I/O module in an overbridge, or adjacent in a mounting rack assembly. Switches insert the unit at mic-pre, equalizer out, tape out, or patch. Operation is indicated with a 20 segment LED display.

Price:

$545.00

CLG-32 dynamics unit replaces the preamplifier of a Westar console for line-in applications, such as MIDI and post-production. Simplified controls allow fast, easy operation, with a single switch-COMPRESSOR/LIMITER used to change the functions.

Price:

$400.00

ORBAN ASSOCIATES INC.

464A Co-Operator is a gated stereo leveler/compressor/high-frequency limiter/peak clipper. Features include a faster compression function that can be switched in to provide additional transient overshoot protection, a defeatable silence gate to prevent rush-ups and pumping, six switchable high-frequency limiting curves, and two LED bargraphs. Other features include concealed "least used" controls, and a defeatable clipper.

Price:

$1,195.00 plus $24.00 with XLR in/out

424A gated compressor/limiter/de-esser features selectable linear or exponential release time characteristics, defeatable gate with adjustable threshold, separate compressor/limiter and de-esser control loops, better than 25 dB de-ess gain reduction, multiple channels can be connected to track together, balanced inputs and outputs.

Price:

$1,095.00 plus $24.00 with XLR in/out

412A compressor/limiter features peak limiting and compressor functions are crosscoupled to eliminate potential pumping and modulation effects, THRESHOLD control with 20 dB range, hard-wired system bypass switch, side-chain externally accessible for special effects, STEREO COUPLING switch for stereo/dual mono operation, RFI suppression on input.

Price:

$459.00 plus $12.00 with XLR in/out

PEAVEY AUDIO MEDIA RESEARCH

AMR CDS2 features compression ratio which is achieved by a single knob adjustment, and the attack/release time variable is governed by a three position switch selector. Also provided is a user variable de-essing control and a five segment LED array to display all valid gain reduction data. The unit may be operated in dual/mono or "link" stereo. The side chain capability on both channels allows for external compression triggering. Insert jack is a 0.25-inch stereo (TRS) connector.

Price:

$199.50

AMR NGT2 offers dual channel operation with a side chain feature that allows the channel's gating action to be externally triggered, in addition to a full array of gate parameter controls. Each channel also includes a trigger output (RCA jack) for applying a trigger pulse to external synchronizable instruments such as electronic drum machines, etc.

Price:

$199.00

R835 is a stereo 2-way or mono 3-way crossover with 18 dB/octave Butterworth state-variable filters. Switching from stereo to mono mode is internal and requires no patching or rewiring.

Price:

$269.95

FURMAN SOUND, INC.

TX-324 stereo 2-way/mono 3-way crossover features 24 dB/octave roll-off slopes. Field select, allows optimizing filters for long-throw (Butterworth) or near-field (Cauer). Hard limiters on each output with adjustable threshold provide speaker protection. Includes on/off transient muting, ground lift switch, in and out level controls, limit threshold indicators. Optional balanced configuration. Dimensions are 1.75x19x8. Weight is 7 lbs.

Price:

$399.00

TX-424 stereo 3-way/mono 4 or 5-way crossover has similar features to the TX-324. Dimensions are 3.5x19x8. Weight is 9 lbs.

Price:

$529.00

TX-524 stereo 4-way crossover has similar features to TX-324. Dimensions are 3.5x19x8. Weight is 9 lbs.

Price:

$649.00

TX-3A tunable crossover is an economical 12 dB/octave crossover that may be used for either stereo 2-way or mono 3-way applications. Includes calibrated input and output level controls, power indicator, ground lift switch. Optional balanced configuration. Dimensions are 1.75x19x8. Weight is 7 lbs.

Price:

$299.00

LT SOUND —See our ad on page 30

ECU-2 is a stereo electronic crossover unit capable of stereo biamping as well as stereo triamping. Crossover points are continuously variable from 70 Hz to 11 kHz. It has 12 dB/octave Butterworth filters, summed mono output for subwoofer operation, and individual phase switches on mid and high bands. Dimensions are 1.75x19x7.5. Weight is 6.4 lbs.

Price:

$295.00

RANE CORPORATION

AC 22 and AC 23 state variable time correcting crossovers feature 24 dB/octave Linkwitz-Riley filter performance via 41-detent frequency selector controls, built-in variable time delay for phase correction, automatic internal configuration switching, mute switches and both input and output level controls with 6 dB gain each.

Price:

$389.00 and $499.00

DELAYS

ADA SIGNAL PROCESSORS INC.

Digitizer 4 is a fully programmable digital delay featuring 32 programs, 17 kHz frequency response, 1024 milliseconds of delay, stereo outputs and an LED readout which displays delay time or function. Dimensions are 1.75x19x10.25. Weight is 7 lbs.

Price:

$699.95

DOD ELECTRONICS (DIGITECH & AUDIO LOGIC)

RDS 1900 rack mounted digital delay unit offers approximately 2 seconds of full bandwidth delay (15 kHz, 87 dB) for echo, slap back and infinite repeat effects, and 10 to 1 ratio for flanging or chorusing.

Price:

$319.95

RDS 7.6 Time Machine rack mounted digital delay and sampling unit offers up to 7.6 seconds of delay or sample recording at full bandwidth (15 kHz, 87 dB), four delay/sample ranges, multiple footswitch controllable functions, and a 10 to 1 ratio for flanging or chorusing.

Price:

$399.95

RD 320B is a single output digital audio delay using PCM technology and is intended for large room speaker timing and concert hall spatial effects. The time delay range of the unit is from a minimum of 5 milliseconds to a maximum of 320 milliseconds in 5 millisecond increments.

Price:

$349.95

R1D1 is a single channel digital delay unit capable of up to 327 milliseconds of delay. The unit has linear PCM 16-bit A-to-D-to-A conversion and is DIP switch set. Minimum increment of delay is 5 milliseconds.

Price:

$450.00

R2D3 has three independent delay outputs, each capable of up to 327 milliseconds of delay (optional up to 1.307 seconds of delay). The unit has linear PCM 16-bit A-to-D-to-A conversion and a battery backed-up memory which retains settings when the power to the unit is removed. Minimum increment of delay is 20 microseconds.

Price:

$799.00

JBL PROFESSIONAL

7922 audio delay is a 0 to 327 millisecond audio delay in 10 microsecond steps; one input, two independently delayed outputs; linear phase anti-aliasing filter (±5 degrees, 20 Hz to 20 kHz) for audio quality and sharp imaging. Dimensions are 1.75x19x14.5. Weight is 8.5 lbs.

Price:

$1,295.00

KLARK-TEKNIK ELECTRONICS, INC.

DN716 is a multiple output digital audio delay line that features 16-bit linear conversion, 50 kHz sampling and proprietary thick-film anti-aliasing filters. Dynamic range is greater than 90 dB. Other features include one in/three out, and adjustability in 20 microsecond increments up to 1.3 seconds. Dimensions are 1.75x19x11.75.

Price:

$1,625.00

SOUND CONCEPTS INC.

SSD550 surround and ambience delay system has two channels of 5ms to 50ms of delay and matrix circuit for film "surround" output. Switchable to sequential delay up to 100ms and mixed outputs available. Signal to noise ratio is 90 dB response 10 Hz to 8 kHz. Dimensions are 3.5x19x9, and weight is 8 lbs.

Price:

$789.00

EQUALIZERS

ADA SIGNAL PROCESSORS, INC.

MQ-1 MIDI programmable equalizer is a fully programmable 2/3-octave stereo equalizer with constant-Q filtering. The unit stores up to 99 equalization curves with 14 frequency bands per channel. Dimensions are 10.5x19x1.75. Weight is 7 lbs.

Price:

$699.95

ALESIS

Micro EQ is a monophonic, three band parametric equalizer featuring continuous frequency control, boost/cut controls with a range of ±15 dB, and a two-position 'Q' switch that selects octave and 1/4-octave bandwidth curves.

Price:

$125.00

ALTEC LANSING CORPORATION

1750A cut-only 1/3-octave mono equalizer has 28 constant-Q filters from 31.5 Hz to 16 kHz, 15 dB of attenuation per filter, 20 dB of broadband gain, variable high and low-pass filters, electrically balanced in/out with optional xfmr, XLR and barrier strip. Dimensions are 3.5x19x9.75. Weight is 10.7 lbs.

Price:

$996.00

1753A boost-cut 1/3-octave mono equalizer has 28 constant-Q filters from 31.5 Hz to 16 kHz, 12 dB cut/boost per filter, 20 dB broadband gain, variable high and low-pass filters, electrically balanced in/out with optional xfmr, XLR and barrier strip. Dimensions are 3.5x19x9.75. Weight is 10.7 lbs.

Price:

$996.00

8551A programmable microaudio equalizer has a single memory, is only one rack space, and has no front panel controls. Features include (programmer purchased separately) 28 one-third octave filters with 12 dB of cut/boost, fixed high and low-pass filters, electrically balanced in/out, barrier strip only. Dimensions are 1.75x19x7. Weight is 5.9 lbs.

Price:

$900.00

8558A programmable microaudio equalizer has eight memories, is only one rack space, and has no front panel controls. Features include (programmer purchased separately) 28 one-third octave filters with 12 dB of cut/boost, fixed high and low-pass filters, electrically balanced in/out, barrier strip only. Dimensions are 1.75x19x7. Weight is 5.9 lbs.

Price:

$1,100.00

8055A microaudio programmer is one of three available programmers for the 8551A or 8558A equalizers, handheld, control indicators are two LED arrays, powered by communications cable, communications cable included. Dimensions are 6.13x8.25x2.25. Weight is 1.4 lbs.

Price:

$550.00

APPLIED RESEARCH & TECHNOLOGY—See our ad on page 27

IEQ 1/3-octave programmable equalizer has ultra-low noise and distortion. It can store up to 128 equalization settings. Video output allows visual observation equalization curves. Smart Curve software virtually eliminates adjacent band interaction. Dimensions are 1.75x19x10.5. Weight is 9 lbs.

Price:

Available upon request.

High definition graphic equalizers incorporate new circuitry for precise equalization. Features include 60 mm slider travel, ultrasonic and subsonic filters, hardwired fail-safe bypass and signal/clip metering. Dimensions are 3.5x19x5.

Price:

Available upon request.

ASHLY AUDIO INC.

PQ-66 and PQ-63 are parametric equalizers that offer control that can tune over a 5.5-octave range. Features include adjustable bandwidth from 3-1/3 to 1/20 of an octave, full 20 dB of headroom, true reciprocal curves, master and individual band in/out bypass switching (master only on PQ-63), optional 8-band mono operation on PQ-66.

Price:

$699.00 (stereo 66) and $399.00 (mono 63)

GQ-215 offers two channels of 2/3-octave, 15-band equalization. It features peak indicating LED, a fixed, switchable 40 Hz subsonic filter and a cut or boost range of ±15 dB.

Price:

$495.00

GQ-131 is a mono 1/3-octave, 31-band equalizer, incorporating a switchable subsonic filter that is tunable between 8 Hz and 200 Hz, and a boost or cut range of either ±6 dB or ±15 dB. A nine position three color LED level meter, and a peak-indicating LED provide visual reference.

Price:

$539.00

GQ-231 has two separate channels of 1/3-octave, 31 band equalization, each incorporating the same features as the GQ-131. All models include detented metal-shaft fader with saddle knob and precision Wein-bridge filters for accurate response and low distortion.

Price:

$989.00

DOD ELECTRONICS CORPORATION

R430C is a dual channel 15-band graphic equalizer offering up to 12 dB of boost and cut in a single rack space size. Bands are 2/3-octave ISO centered and are detented at 0 dB.

Price:

$329.95 and $359.00 (with XLRs)

R831C graphic equalizer has 31-1/3 octave ISO centered frequency bands with 12 dB of boost or cut in a two rack space size. Sliders are long throw and are center detented at 0 dB.

Price:

$329.95 and $344.95 (with XLRs)

SC31 graphic equalizer offers 31-1/3 octave, ISO centered frequency bands with 12 dB of boost/cut or 6 dB of boost/cut in a two rack space size. The unit features XLR, 0.25-inch balanced phone jacks, barrier strip connections, and variable frequency high-pass and low-pass filters.

Price:

$550.00

SC131 graphic equalizer is a cut-only 31-band 1/3-octave equalizer with 20 dB of cut or 10 dB of cut in a two rack space size. The unit features XLR, 0.25-inch balanced phone jacks, barrier strip connections, and variable frequency high-pass and low-pass filters.

Price:

$550.00

SC215 graphic equalizer offers two channels of 15-2/3 octave bands equalization. Each band has 12 dB of cut or boost or a selectable range of 6 dB of cut or boost in a compact two rack unit size space.

Price:

$565.00

FURMAN SOUND, INC.

GQ-31 graphic equalizer is a compact 31-band single rack space graphic equalizer with extremely low noise, even with large amounts of boost or cut. Features include ± 12 dB of equalization, gain control, LED indicators for overload, equalizer IN, and power, as well as LOW CUT button and ground lift switch. Optional balanced configuration. Dimensions are 1.75x19x8. Weight is 6 lbs.

Price:

$349.00

GQ-15 stereo graphic equalizer is the same as the GQ-31 except with two channels, each with 15 bands spaced at 2/3-octave intervals and is a single rack unit high.

Price:

$359.00

GQ-62 stereo 31-band graphic equalizer is the same as the GQ-31 except two complete 31-band channels in one double-height rack chassis. Dimensions are 3.5x19x8. Weight is 10 lbs.

Price:

$665.00

PQ-4 parametric equalizer is a four-band full parametric equalizer with constant-Q curves. Features include peak/shelf switches on top and bottom bands, extra wide range of bandwidth and equalization adjustment, input level control, equalizer IN button, as well as overload, Equalizer status, and power indicators. The unit has high and low level inputs and outputs and a footswitch jack, allowing use as a preamp. Balanced configuration is optional. Dimensions are 1.75x19x8. Weight is 6 lbs.

Price:

$359.00

SG-10 sweep graphic equalizer combines graphic and parametric equalization. The unit has 10 bands, each with slider and frequency control. It may be used in 10-band mono or 5-band stereo modes. Includes input level controls, low-cut filters, equalizer IN/BYPASS buttons, overload and equalizer status indicators. Unit also has high and low-level inputs and outputs. Optional balanced configuration. Dimensions are 3.5x19x8. Weight is 8 lbs.

Price:

$395.00

JBL PROFESSIONAL

5547A graphic equalizer has thirty adjustable boost-cut bands on ISO 1/3-octave center frequencies. Features include fully active-custom hybrid amplifiers in filter circuits, high and low frequency tunable end cut filters, active and passive bypass modes. Dimensions are 3.5x19x8. Weight is 9.5 lbs.

Price:

$995.00

5549A room equalizer has thirty adjustable boost-cut bands on ISO 1/3-octave center frequencies, unique gain structure controls optimize headroom and signal-to-noise ratio for different signal level environments, high and low frequency tunable end cut filters. Dimensions are 3.5x19x8. Weight is 9.5 lbs.

Price:

$1,045.00

KLARK-TEKNIK ELECTRONICS, INC.

DN405 single 5-band parametric equalizer has 5 bands of fully parametric equalization with separate variable high and low-pass filters. All 5 bands variable from 20 Hz to 20 kHz. 1/12 to 2 octave variable bandwidth. Transformer balancing available. Dimensions are 1.75x19x11.25. Weight is 13.2 lbs.

Price:

$695.00

DN410 dual 5-band parametric equalizer is the same as the DN405 but with switchable stereo 5-band/mono 10-band operation. Dimensions are 3.5x19x11.25. Weight is 15.4 lbs.

Price:

$995.00

DN360 dual 1/3-octave graphic equalizer has 2 x 32 oil damped faders at 1/3-octave ISO frequencies with switchable ±6/ ±12 dB scale. Switchable 30 Hz low-cut filters. Dimensions are 5.25x19x8. Weight is 15.4 lbs.

Price:

$1695.00

DN332 dual 2/3-octave graphic equalizer has 2 x 16 oil damped faders at 2/3-octave ISO frequencies with switchable 30 Hz low-cut filters. Dimensions are 3.5x19x8. Weight is 13.2 lbs.

Price:

$1,095.00

DN300 1/3-octave graphic equalizer has 30 oil damped faders at 1/3-octave ISO frequencies between 25 Hz and 20 kHz. Also included is adjustable high and low-cut 12 dB per octave shelving filters with selectable 6/12 dB per octave slope. Dimensions are 3.5x19x8. Weight is 13.2 lbs.

Price:

$1,050.00

LT SOUND —See our ad on page 30

PEQ-2 is a dual-channel, 4-band parametric equalizer with selectable peak/dip or shelving response on upper or lower bands, overall hard-wire bypass and individual bypass on middle two bands. The bandwidth is variable from 0.15 octave to 2 octaves. Dimensions are 3.5x19x7.5. Weight is 11 lbs.

Price:

$595.00

PEQ-1 is a single-channel version of the PEQ-2. Dimensions are 1.75x19x7.5. Weight is 5 lbs.

Price:

$349.00

OXMOOR CORPORATION

DEQ-29 is a 1/3-octave programmable equalizer without a physical control panel. Equalization is adjusted by using the Oxmoor TWEEQ software program and the Apple Macintosh computer. Sixteen equalizers can be controlled by one computer. Dimensions are 1.72x19x13.5 and weight is 10 lbs.

Price:

$2,533.00

PEAVEY AUDIO MEDIA RESEARCH DIVISION

PME4 four-band parametric equalizer delivers precision full bandwidth control over greater than 11 octaves with state-variable filters. Each of the four bands delivers exactly calibrated frequency adjustment, variable Equalization with a range of 1/6 to 2 full octaves, and continuously variable, symmetrical, 18 dB boost/cut capability. PME8 is the stereo version of the PME4 in a two rack space package.

Price:

$199.50 and $349.50 (PME8)

RANE CORPORATION

ME30 and ME15 Micrographic equalizers feature accurate constant-Q 1/3 and stereo 2/3-octave performance in single rack space, with switchable 12 dB boost/cut, input level, hard-wire bypass and 20 MM center-detent sliders.

Price:

$359.00 and $369.00

GE27 and GE14 graphic equalizers feature accurate constant-Q 1/3 and 2/3-octave performance in two rack space packaging, with 45 MM center-detent sliders, level control, hard wire bypass, low noise and low distortion circuitry.

Price:

$499.00

GE30 interpolating 1/3-octave graphic equalizer is a commercial grade constant-Q design with selectable boost-cut/cut-only operation, long throw 60 MM sliders, built-in sweepable high and low cut filters, switch-selectable direct or transformer-coupled balanced outputs via three-pin and terminal strip, dual range gain control and steel security cover.

Price:

$749.00

SP15 studio grade parametric equalizer and notch filter provides 5 bands of fully symmetrical operation, each with 4-octave frequency sweep range, bandwidth variable from 1.5 to 0.03-octave, +12/–15 dB boost/cut, individual bypass, overall bypass and gain control, and fully balanced input and output. Noise and distortion specifications exceed 16-bit digital performance.

Price:

$599.00

SOUNDCRAFTSMEN —See our ad on page 21

AE2000P equalizer/real time analyzer incorporates differential/comparator measurement system for ± 0.1 dB analyzer accuracy. Features include dual channel 10-band equalizer, built-in pink-noise generator with automatic or manual octave scanning, front and rear panel input/output jacks, signal-to-noise ratio of 114 dB, equalization filters ± 15 dB. Dimensions are 5.25x19x11.25. Weight is 16 lbs.

Price:

$799.00

TG3044C dual-mono 21-band equalizer has 1/3-octave center frequencies from 40 Hz to 1 kHz and 2/3-octave center frequencies from 1 kHz to 16 kHz. Other features include sub-sonic filter, equalizer defeat, pre/post switching for each channel, –114 dB signal-to-noise, transformerless balanced or unbalanced input/output via XLR or 0.25-inch phone jacks. Dimensions are 5.25x19x11. Weight is 14 lbs.

Price:

$749.00

G2241 dual channel octave equalizer. Differential/comparator system provides fast, accurate balancing of input to output assuring maximum dynamic range, minimum residual noise and distortion. Other features include 45 mm sliders, signal-to-noise ratio –114 dB, and pre/post equalizer switching. Dimensions are 3.5x19x9. Weight is 10 lbs.

Price:

$349.00

SYMETRIX INC.

SX201 parametric EQ/Preamp is a studio quality equalizer/notch filter that features ± 15 dB boost and –30 dB cut capability, unbalanced preamp input, balanced or unbalanced line level input, high headroom balanced or unbalanced line driver output. Weight is 5 lbs.

Price:

$239.00

TEAC CORPORATION OF AMERICA—See our ad on page 4-5

GE-20B 10-band, 2-channel graphic equalizer provides 12 dB of peak/dip equalization at standard 1-octave ISO center frequencies (31.5, 63, 125, 250, 500, 1 K, 4 k, 8 k, and 16 kHz.) Each channel has a separate pair of 12 dB/octave cutoff filters, a 31.5 Hz high-pass and a 16 kHz low pass. Dimensions are 3.5x19x7.75. Weight is 9.25 lbs.

Price:

$325.00

PE-40B 4-band/4-channel parametric equalizer features 4 equalizer bands that overlap for maximum equalization flexibility. Each band offers a full complement of parametric controls such as frequency, Q, and gain. Dimensions are 3.5x19x9. Weight is 10.33 lbs.

Price:

$650.00

WHITE INSTRUMENTS

4400 1/3-octave, L-C active graphic equalizer. Features include 28 filters from 31.5 Hz to 16 kHz, 10 dB cut/boost, variable high and low-pass filters, 3 outputs for triamplified operations, noise better than –92 dBv (at any equalization setting), precision rotary controls, frequency center tolerance is ±3 percent (very accurate). Dimensions are 3.5x19x8. Weight is 11 lbs.

Price:

$1,050.00

4200A 1/3-octave, L-C active, cut only graphic equalizer is the cut-only sister to the 4400. Features include 28 filters, 15 dB cut, high and low-pass filters, 3 outputs and level trimmers for tri-amplified operation, –92 dBv noise (at any equalization setting), and precision rotary controls. Dimensions are 3.5x19x8. Weight is 11 lbs.

Price:

$1125.00

4660 1/3-octave, R-C active graphic equalizer features 28 filters, 60 mm linear controls, variable high and low-pass filters, –82 dBv noise (at any equalization setting), less than 0.05 percent THD, up to 10 dB gain, unique one light metering, XLR and TRS connectors. Dimensions are 3.5x19x8. Weight is 6 lbs.

Price:

$699.00

4675 2/3-octave, two channel, R-C active graphic equalizer has 14 filters per channel, 60 mm linear controls, variable high-pass filters. Other features include balanced servo input and output, –82 dBv noise, less than 0.05 percent THD, up to 10 dB gain, and XLR connectors. Dimensions are 3.5x19x8. Weight is 6 lbs.

Price:

$779.00

MISCELLANEOUS PROCESSORS

ADA SIGNAL PROCESSORS, INC.

2FX digital multi effects produces 2 effects at once. Functions include digital flanger, digital chorus and digital delay. Flange or chorus may be used with echo maximum 1024 milliseconds of delay at 17 kHz. Dimensions are 1.75x19x10.5. Weight is 7 lbs.

Price:

$599.95

Pitchtraq programmable pitch transposer has 32 presets that can be programmed in ratio, cents or standard intervals. Transposition range is over 2 octaves. Dimensions are 1.75x19x10.5. Weight is 7 lbs.

Price:

$699.95

AKG USA

CAP 340M is a digital audio signal processor. Being freely programmable, modular, and entirely software controlled, it provides a vast range of applications with its "blank slate" approach, such as digital mixing, user-definable multi-band, angle dependent filtering and delay time, and room simulation. Other applications include psychoacoustic research, listening tests, sound source localization, timbre, and filter design.

Price:

To be announced.

APHEX SYSTEMS LTD. —See our ad on page 13 & 17

103A-type C Aural Exciter is an audio processor that will recreate and restore missing harmonics. Dimensions are 1.75x17x6. Weight is 4.5 lbs.

Price:

$299.00

700-Dominator is a 3-band peak processor that increases the perception of transients while maintaining absolute peak processing. Dimensions are 1.75x19x9. Weight is 10 lbs.

Price:

$1,195.00

300-Compellor is an audio processor that delivers intelligent compression, leveling, and peak limiting simultaneously. Dimensions are 1.75x19x9. Weight is 11 lbs.

Price:

$1,195.00

DOD ELECTRONICS (DIGITECH)

IPS 33 Smart Shift is an intelligent harmonizer that can add up to two pitch shifted notes to your original note in a predefined harmony pattern. The unit is MIDI controllable with 41 harmony patterns pre-defined and the unit can store up to 99 presets.

Price:

$799.00

GOTHAM AUDIO

BW 102/33 A/D converter, together with the BW 102/16 D/A converter completes the interfacing of the HMA (Harmonia Mundi Acustica) system. The A/D converter accepts analog input signals at microphone or line levels. Features include true stereo 16-bit conversion (without delay between channels) at sampling frequencies of 44.1 or 48 kHz. The system includes comprehensive digital audio processing functions such as level (mixing) control, parametric equalization, compression, limiting, expansion, noise gate and reverb functions. It generates a 44.1 or 48 kHz master word clock to synchronize the rest of the system or it may be slaved to an external sync input signal.

Price:

To be announced.

INDUSTRIAL RESEARCH PRODUCTS, INC.

System 41 is a modular signal processing system for quality sound reinforcement systems. Thirteen card slots allow for insertion of mix mixers, line mixers, TEQ equalizers, notch filters, cross-overs, distribution amplifiers, line drivers, remote control, and custom design cards. Dimensions are 10.5x19x11. Weight is 35 lbs.

Price:

$2,500.00 (price depends on module configuration)

LEXICON INC.

480L digital effects system offers flexibility and sonic excellence with its 20 Hz to 20 kHz bandwidth, 18-bit A/D converters, digital I/O, and dynamic MIDI implementation. Pitch shifting, doppler effects, and sampling are implemented as well. 11.9 seconds of phase-locked stereo sampling at 48 kHz is available with the optional SME (sampling memory expander) board.

Price:

Available upon request.

LXP-1 digital multi-effects processing module offers a full range of delay and reverberation effects, fast intuitive programming, and complete MIDI implementation. Features include over 4000 distinct sounds accessible from the front panel, 128 user registers, dynamic control for real-time performance and sequencer-based automation, and system exclusive implementation for as many as 8 variable parameters per program.

Price:

Available upon request.

LT SOUND —See our ad on page 30

ECC echo control center is a digital delay system also having microplate reverb capability. The delay and reverb can be used together or independently. Delay times are from 1 millisecond to 1 second. Delay time on reverb is variable from 0.6 seconds to 2.4 seconds. Effects include doubling, chorus, flanging, plate reverb with delay, acoustic chamber and tremolo. Dimensions are 1.75x19x7.5.

Price:

$995.00

ORBAN ASSOCIATES INC.

536A dynamic sibilance controller features two independent channels, effective/inaudible de-essing over a 15 dB input range, active-balanced input for +4 or –10 dBm, active-balanced output with transformer option, dual-LED gain reduction metering, overload/noise ratio of 105 dB, very low distortion, effective RF suppression all in a 19-inch rack-mountable package.

Price:

$589.00 (plus $24.00 for XLRs and $32.00 for balanced transformers)

ROCKTRON CORPORATION —See our ad on page 3

Hush IIX noise reduction is a single channel/mono, 1/2-rack space unit with up to 50 dB of noise reduction.

Price:

$179.00

Hush IIBX is one channel (mono) of up to 50 dB of noise reduction in a single rack space.

Price:

$309.00

Hush IICX is a stereo single rack space noise reduction unit with up to 50 dB of noise reduction.

Price:

$409.00

Hush 2000 is stereo/single-ended noise reduction featuring balanced in/out 0.25-inch XLR connections, adjustable expander threshold, ratio and release. Other features include filter sensitivity/release/cut-off, and full metering all in a single rack space.

Price:

$799.00

REVERBS

ALESIS

Microverb II is a 16-bit digital reverb that offers a comprehensive range of classic reverb programs. Integrated technology is coupled with an intuitive, simple to operate control panel featuring INPUT, MIX, and OUTPUT controls. Other features include stereo in, stereo out, and operation at 15 kHz bandwidth.

Price:

$199.00

Midiverb II is a full 16-bit PCM stereo multiple effects processor offering 99 programs with full 15 kHz bandwidth. These include 49 reverb programs, plus flange, triggered flange, chorus, multi-voice chorus, delays, multi-tapped delays, special effects and more. Other features include easy front panel manual control, program changes accessible via MIDI, 32 MIDI patch locations which allow any of the 99 programs to be MIDI-mapped by the user.

Price:

$269.00

Quadraverb is a 16-bit simultaneous effects digital signal processor. There are 100 fully programmable memory locations with 90 factory programs provided, and 20 kHz bandwidth. Features include touch sensitive parameter buttons that speed up as they are pressed harder, MIDI control of program parameters, system exclusive data storage, program naming, and a program advance footswitch jack.

Price:

$449.00

APPLIED RESEARCH AND TECHNOLOGY —See our ad on page 27

MultiVerb is a 20-bit ultra-high resolution effects processor. Features include pitch transposing, 200 memory locations, fully programmable, and the ability to process four simultaneous effects. Dimensions are 1.75x19x9.25. Weight is 9 lbs.

Price:

Available upon request.

Proverb 200 has two hundred presets and 16-bit internal architecture. The unit has over 120 reverb variations and many studio designed presets. Dimensions are 1.75x19x7.25. Weight is 9 lbs.

Price:

Available upon request.

DOD ELECTRONICS (DIGITECH)

DSP128 Plus digital multi-effects signal processor has digital reverberation, chorusing, flanging, delay and multi-tap delay effects which are all MIDI controllable with up to four effects at a time. 128 different presets may be stored and accessed with MIDI program change numbers.

Price:

$499.00

FURMAN SOUND, INC.

RV-3 digital reverberation system is an easy-to-use digital reverb featuring a choice of 2 halls, 2 rooms, 2 plates, or gated or reverse reverb. Each may be used with one of four decay times. Other features include PRE-DELAY, POSITION, HI and LO roll-off buttons, direct and reverb mix controls, input level control with 10-section LED meter, and stereo outputs. Dimensions are 1.75x19x8. Weight is 8 lbs.

Price:

$599.00

KLARK-TEKNIK ELECTRONICS, INC.

DN780 digital reverberator/processor utilizes 32-bit VLSI circuitry to achieve a more natural sounding reverb. Contains 89 non-volatile memory locations plus spatial effects. Includes remote control. Dimensions are 3.5x19x12.25. Weight is 22 lbs.

Price:

$2,595.00

LT SOUND
RCC reverb control center is a complete microplate reverb system for use with or without a mixing board. It has 2 microphone inputs, inputs for 2 additional stereo sources, and an output for a tape recorder plus 3-band equalization. Dimensions are 1.75x19x7.5. Weight is 7 lbs.

Price:

$595.00

RV-2 stereo reverb unit features the microplate reverb system and has over 18 kHz of frequency response. Other features include 4 simultaneous inputs per channel for 3 different sounds, 7-segment LED level indicator on each channel, and decay time control of 0.6 to 2.4 seconds. Dimensions are 1.75x19x1.75. Weight is 8 lbs.

Price:

$895.00

ORBAN ASSOCIATES INC.
111B dual spring reverb has performance highlights that include two independent channels with six springs per channel, floating threshold peak limiter protects against "twang" and "boing" noises, bass and quasi-para-metric midrange equalization allows coloring of echo return, front panel mixed output control, accepts input levels from –30 to +4 dBm, industrial quality construction and rugged package, and an extremely low signal-to-noise ratio (better than 76 dB) and distortion (THD at 5 kHz is less than 0.2 percent).

Price:

$959.00

PEAVEY AUDIO MEDIA RESEARCH
Addverb II digital reverb is a MIDI-capable, multi-effects processor with 100 preset effects, including 50 reverb sounds and a full array of delay effects, including chorus, flange, echo, straight delay and special effects. Any of the 100 front-panel accessible effects may be copied to any other location. Reverbs and specials may not be modified, but can be copied to other locations.

Price:

$399.99

DSR1000 features echo, pre-delay, early reflections, room size, tonal color, reverb time, left and right stereo channel delay, left and right stereo echo feedback, chorus rate, depth, delay time and feedback. Every effect group can be replaced in the entire range of 100 effects slots with customized digital effects. Full MIDI access is provided.

Price:

$499.99

Ultraverb is a true digital stereo multi-effects processor. Features include echo, pre-delay, early reflections, room size tonal color, reverb time left and right stereo channel delay, left and right stereo echo feedback, chorus rate, depth, delay time and feedback. All of the factory presets can be refiled in different location num-bers with five easily mastered keystrokes. Full MIDI access is provided.

Price:

$449.99

Univerb II is a digital stereo reverb that offers 128 separate stereo reverb effects, 16-bit digital processing, input-level/effect-mix and output-level controls, input signal status LEDs, 0.25-inch inputs and outputs, wide bandwidth response from 20 Hz to 12 kHz at any reverb selection, and full MIDI access all in a single-space, 19-inch rack-mount chassis.

Price:

$299.99

TEAC CORPORATION OF AMERICA
RS20B is a dual channel spring reverb system. Features are separate in/out level controls, 200 Hz HPF, 6 dB per octave roll-off filter, 1/4-inch and RCA in/out jacks, effect in/out switch. Frequency response is 30 Hz to 20 kHz ±0.5 dB reverb out, 100 Hz to 4 kHz +0, –6 dB reverb in. S/N ratio is 75 dB (unweighted), 80 dB IHF weighted at 400 Hz. Dimensions are 19x3-7/16x8, and weight is 8.5 lbs.

Price:

$400.00

ADDRESSES

ADA Signal Processors, Inc
7303D Edgewater Dr
Oakland, CA 94621

AKG Acoustics, Inc
77 Selleck St
Stamford, CT 06902

Alesis
7347 Hinds Ave
North Hollywood, CA 91605

Altec Lansing Corporation
10500 West Reno Ave
Oklahoma City, OK 73128

Aphex
13340 Saticoy St
North Hollywood, CA 92705

Applied Research &
Technology
215 Tremont St
Rochester, NY 14608

Ashly Audio, Inc
100 Fernwood Ave
Rochester, NY 14621

BGW Systems, Inc
Box 5042
Hawthorne, CA 90251-5042

Brystonvermont Ltd
RFD #4, Box 2255
Montpelier, VT 05663

Carvin Corporation
1155 Industrial Ave
Escondido, CA 92025

DOD Electronics Corporation
5639 S. Riley St
Salt Lake City, UT 84102

Furman Sound
30 Rich St
Greenbrae, CA 94904

Gotham Audio
1790 Broadway
New York, NY 10019-1412

Industrial Research Products
321 Bond St
Elk Grove Village, IL 60007

JBL Professional
8500 Balboa Blvd
Northridge, CA 91329

Klark-Teknik Electronics, Inc.
30 B Banfi Plaza
Farmingdale, NY 11735

Lexicon, Inc
100 Beaver St
Waltham, MA 02154

LT Sound
7980 LT Parkway
Lithonia, GA 30058

Mitsubishi Pro Audio Group
225 Parkside Dr
San Fernando, CA 91340

Orban
645 Bryant St
San Francisco, CA 94107

Oxmoor Corporation
237 Oxmoor Circle
Birmingham, AL 35209

Peavey Audio Media
Research
711 A St
Meridian, MS 39301

Rane Corporation
10802 47th Ave W
Everett, WA 98204-3400

Rocktron Corporation
1633 Star Batt Dr
Rochester, NY 48063

Sound Concepts
27 Newell Rd
Brookline, MA 02146

Soundcraftsmen
2200 So. Ritchey
Santa Ana, CA 92705

Symetrix, Inc
4211 24th Ave W
Seattle, WA 98199

Teac Corp of America
7733 Telegraph Rd
Montebello, CA 90640

White Instruments
Box 698
Austin, TX 78767

previous issues of **db**, and there seems to be a great deal of interest in Brian's upcoming audiocassette package for producing radio spots!

Dear Brian,

I really enjoyed your article, *Gain the Ad-Vantage* in the March/April **db**. So when did you see our production room here in El Dorado? I could swear you were referring to our box of broken carts! Actually, we have very good equipment for a small-market station, and a good prod staff, but we all enjoyed your article. Even though I consider myself a **superior** copywriter/production director, it's good to hear others who share in your grief over needless mayhem.

'Course, I'm always open to suggestions, which is why I'd like to have some info on your production cassette in the works. Please drop me a card when it's ready for distribution. And DON'T charge and arm and a leg for it, because we have a real cheap owner who probably won't spring for it, and it will have to come out of my own pocket, okay? 'Preciate it!
Sincerely,
Vicki S. Wyatt
Production Director/KLBQ-FM

Dear Vicki,

My humblest thanx to the Production Director at KLBQ-FM in El Dorado, Arkansas. Don't panic, Vicki, the audiocassette package won't be expensive. The price will only reflect costs incurred in production, duplication, mailing, printing, promotion, and my innumerable years of toil and hard-won experience in the field of producing radio spots, plus a profit margin that will make the Gross National Product look like a wino's pocket change. A second mortgage should be sufficient.
Brian

Dear Mr. Battles,

Please put me on your list for your "comprehensive audio-cassette album" on producing radio spots. It sounds like it's just what the doctor ordered. Also please give us more "formulas" to work from like the Ten Copy Tips in the March/April issue of **db**. Tips and formulas really give the novice a basis to work from, something

to spark the creative juices, or, as the case may be, to fall back on when one is fresh out of creative juice.
Thanks, and keep up the good work.
Sincerely,
Dean Heinbuch

Dear Dean,

Looks like you're becoming a pen pal—thanks for writing again, Dean.
Brian

Hi, Brian,

Just wanted to say I really appreciate your writing and thought you might get a kick out of our current campaign here. We are basically a new production group and we chose to introduce ourselves to advertising agencies with our "cans."

We are using the idea that original music is much better (if it's done well) than "canned" music for local advertisers. The ad agencies have gotten a laugh and it's produced a surprising amount of work for a new company. We hear the cans make great pencil holders so I see that they're getting further use.
Thanks,
Clarke Ripley
Tempest Music Productions

Dear Clarke,

I loved your demo cassette and your wonderfully original "canned" music promo mailer (you're right, it does make a great pencil holder).
Brian

Dear Brian,

I can only think of one thing more shameless than promoting something you need or want in your own published article. I ought to know since I tried to do the same thing in an article I wrote for R&R. It's a cheap organization trying to get something for free! Thus, the reason I'm writing!!
The RAB (Radio Advertising Bureau) is in a constant state of trying to improve the lot of commercial production in this country. I think I actually worked at some of the stations you blindly discussed in your March/April 1988 **db** article! I'm firstly very grateful for the article you wrote. You offer some great tips and a great case for providing at least as much attention to the quality of commercial production as we do the proliferation of sales and new business development. All the

listeners in the world won't matter if we can't produce a spot intriguing enough that it gets listened to. And all of the listening we can elicit ain't worth a hill of beans if we can't get customers to take action and buy the clients' products.

Luckily, we do have people in this industry who are devoted enough to learn all they can about effective and innovative commercial copywriting and production, given the number of requests we receive for copy tips and production ideas.

I'd love to talk to you at greater length about this. I'd also like to see if there is any way we can work together in regards to your upcoming project.
With best regards,
J. Robert Schmid
Radio Advertising Bureau

Dear J. Bob,

Needless to say, I'm thrilled to have the RAB interested in my humble cassette extravaganza. Rest assured that I'll take you up on your offer to get together on the phone soon. The RAB has always been a terrific source of creative commercial ideas, and perhaps we can work together.
Brian

Brian,

I just read your article "Gain the Ad-Vantage" in the March/April 1988 issue of **db** Magazine. Did I enjoy it? I had to check several times to make sure I wasn't the one who *wrote* it! It's sure nice to find someone who has a real understanding of radio writing and production (or: it's sure nice to find someone who's as smart as I am, whichever you prefer). There's only one teensy point you made that I take exception to...but I'll get to that later.

I'm fortunate enough to be a Production Director for a company that cares about production (maybe it's because I've been here for seven years and *I* care about production. Who knows?). Our main production studio "OZ," has all the toys most other radio stations dream about: multi-track, ABX-26 console, Lexicon reverb, Harmonizer, Compellor, noise reduction, etc.— even those nifty cart machines you like and those equally nifty maintenance engineers. Now you know why I named it "OZ." But that's not why I'm writing.

I thought I'd share with you a system we use as part of our cart identification. To wit: Announcer Codes.

For us, "AGY," "AGY/BB," and "BB/SS" just aren't enough. In fact, so many of our spots are AGY that we don't even label AGY spots with AGY. It's an AGY spot if there isn't a code. What's more, knowing where a jock is on a spot is very important when trying to organize a smooth-sounding stop set on the air. (Let's say you have two spots from the same jock. One spot is a full voice-over, the other just a tag. If you run the tag spot first, you'll have the jock's voice in a crummy-sounding back-to-back situation with the voice-over. Ah, but if you run the voice-over first...) So in an effort to make stop sets sound smoother, we use the following Announcer Codes:

COLD VOICE (no music)
Indicate by initials only JK
VOICE-OVER (Voice over music or sound effects)
Indicate by initials "over" JK
DONUT COPY (Voice within jingle or in vocal donut)
Indicate by initials "within" (JK)
TAG (if you have recorded a tag on the spot)
Indicate by "plus" you +JK
TAG OVER MUSIC OR SFX +JK

Some infrequently used codes are:
INTRO (a "tag" at the beginning rather than at the end)
Indicate by initials "plus" JK+
TWO-VOICER (alternating announcers or in-house produced donut)
Indicate opening voice first BB/JK
TAG ON IN-HOUSE PRODUC-TION (if you are tagging a spot made here)

Indicate by lead announcer "plus" you BB+JK

Plus, we use various combinations of these codes to fit situations that may fall into the "none of the above" category. Basically, these codes work...and they work very well! And they are so simple to use and easy to remember that gosh, why aren't they a universal system of codification? Now that they're in the hand of a published author (namely you) maybe they will be (hey, just don't forget who invented them, okay, Brian?).

Now I think you're ready for the bad part of this writing: the "one teeny point" I mentioned earlier.

In Point 9 of your "Ten Copy Tips" you wrote, "Don't say *Attention, skiers*, rather say, *If you ski*..." Brian, really! The word "if" connotes a choice—in advertising, there are no choices...our client's product or service is the only way to go. Strike the "if" line. You don't need it. Besides, you'd probably follow it with "the biggest savings of the season are on now at STORE NAME" anyway. Skiers will get the message. And those who don't ski won't be told not to listen at the beginning of the commercial.

Other than that, like I said, it could have been *my* name at the top of page 8. I especially like how you pointed out the difference between location and street address in Point 5 of your Copy Tips. The line I like to use on our salespeople is "Hey, '1376 Guernsey Street' is fine if you want to send them a *letter*..."

But enough of that stuff.

I'd be interested in hearing your "how to produce radio commercials" cassette. It seems we think alike on production, do we sound alike, too? Maybe we can form a club or something (ever notice how many radio seminars totally ignore production?).

One last thing. I don't know who said it but it's a nice quote to hang on your office wall:

"If everyone's an expert on advertising, how come there are so many bad commercials?"

Or to quote David Ogilvy:

"Any fool can write a bad commercial, but it takes a genius to keep his hands off a good one."

All right, so that's two last things.

It was great reading your article and equally as much fun writing to you. Keep in touch! Wanna talk about spec spots?
Sincerely,
John K
Production Director
WWWW/WCXI

Dear John,

Great reading and great listening in your three-page letter and accompanying cassette. (My buddy Howard Stern used to work at WWWW back around 1980, I believe. I was on the 7:00pm to midnight shift at WCCC AM/FM in Hartford, Connecticut while Howard was on during morning drive time, then he left to go to "W-4.") Thanks for your tips and comments, John. I'll see if I can make a few phone calls and get you a complete last name to use. Maybe I'll also be able to dig up a whole first name for Mr. Schmid while I'm at it.
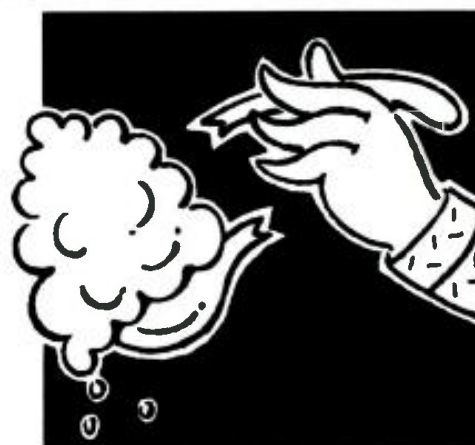
Brian

New Products

CARDIOID MIC

• Conneaut Technologies, Inc. has announced the release of the ASTATIC JT 8 cardioid microphone for the professional entertainer. This unit was designed specifically for acoustic instruments. It has a smooth wide-range frequency response of 40-16,000 Hz, and an output of –55 dB. The JT 8 features I.N.R. (Impact Noise Rejection). This unique shock mounting system isolates the microphone transducer from the handle, reducing cable, stand, and handling noise. The microphone's grille screen is constructed of Flex-Form TM, an alloy that resists deformation. Its effective internal multi stage pop filter minimizes wind and breath noise.

Mfr.- Conneaut Technologies, Inc.
Price- $116.00

Circle 60 on Reader Service Card

DAT RECORDER/PLAYER

• Tascam introduces a new DAT recorder/player, the DA-50, which utilizes unique ZD (zero distortion) circuitry to maximize sonic performance. Unlike analog products in which distortion rises as the sound level increases, distortion in digital products rises as sound levels decrease. This distortion, sometimes known as granulation noise, is due to high levels of quantization error which occur in very quiet musical passages. The four Tascam ZD circuits add and subtract digital dither (random numbers) in the conversion processes to reduce granulation noise to virtually zero. To prevent electrical interference, external vibrations, and resonance from reaching each circuit, the five main sections (power supply, mechanism, digital, analog, control and servo) are shielded in individual, internal boxes. In addition, the DA-50 incorporates seven power supplies using independent transformers for digital and analog circuits. All critical wiring is mono-crystal silver coated cable. Glass epoxy PCBs are used for all the audio, servo and control sections. The final linear phase reproduction circuit is direct-coupled to extend the low frequency response down to 0 Hz. The tape drive mechanism utilizes 4 direct drive brushless motors (drum, capstan, supply and take-up reels). Additional features include 38 key full function hardwired remote, 25 segment/3 color level meter with variable peak hold, blank search and remote controlled motor driven front shielding panel. Dimensions are 6-1/4x19-x18-1/16.

Mfr.- Tascam
Price- $4000.00

Circle 61 on Reader Service Card

ANALOG MULTI-TRACK RECORDER

● Sony Professional Audio introduces the APR-24 analog multi-track recorder/reproducer. It is a 24-track machine utilizing 2-inch tape. It features amorphous heads for improved response and long head life. Additional features of the APR-24, which is suited for audio sweetening and studio recording applications, include built-in chase synchronizer, time-code reader/generator, video reference, resolve capability and Processor Assisted Alignment.

Mfr.- Sony Professional Audio
Price- available upon request

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POWER AMP

● The model 300X4 MOSFET power amplifier from Soundcraftsmen will have its debut at the AES convention in Los Angeles, California. It is a multi-channel design allowing the user to select either two-channel, three-channel or four-channel operation. The unit provides very high power for monitors—600 watts per channel (two-channel) at 8 ohms, for bi-amping, 210 watts per channel (four-channel) at 8 ohms, or tri-amping using two of the 300x4s (each in the three channel mode) for 600 watts per channel for woofers, 210 watts per channel for mid-range, and 210 watts per channel for the high frequency drivers. The amp has a three-rack-space chassis, and has two completely independent
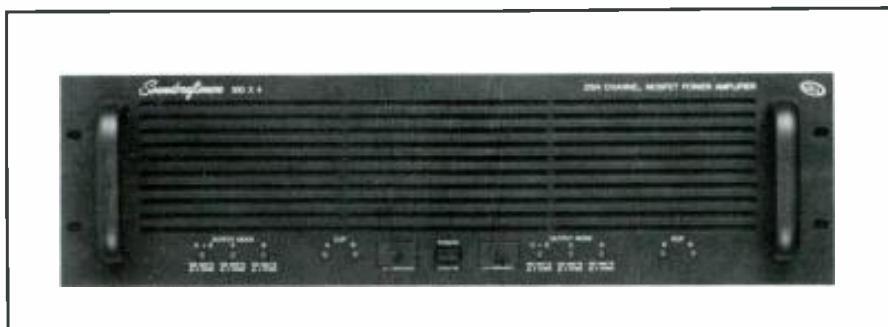
power supplies and two separate power transformers, sharing only a common power cord. Extremely accurate clipping indicators are included for each channel, as well as mode indicators and over-temp indicators. Dimensions are 5-1/4x19x12, and the weight is 58 lbs.

Mfr.- Soundcraftsmen
Price- $1299.00

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SYNCHRONIZER/EVENT CONTROLLER

Peavey Audio Media Research Division announces the release of the Sync-Controller, a SMPTE-based machine synchronizer/event controller with MIDI capabilities. It will control one master and one slave machine. The event controller allows 99 events such as record punch-in and punch-out, cue points, looping and MIDI presets to be stored in memory and executed at the precise point in time for which it was programmed. Unique features include working with audio machines from any manufacturer that have an external voltage or frequency-based speed control facility, and optional machine controllers will allow up to ten machines to be controlled.

Mfr. - Peavey Audio Media Research
Price - $999.50

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BROADCAST LITERATURE

● Bill Daniels Company announces the 1988/1989 edition of **Broadcast** and the accompanying **Technical Data & Application Information Manual.** The Trade Reference covers the complete product lines of Broadcast equipment manufacturers. It has product features, specifications, illustrations, and pricing (when available). The Technical Manual contains system diagrams, charts, terms, how-to information, new technology and more.

Mfr. - Bill Daniels Company
Price - $135.00

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HALF-RACK SERIES

● Symetrix introduces half-rack SX200 series which is packaged in the less costly half-rack size. A two-unit full rack mounting pan is available, allowing two totally different functions to be mounted within a single rack space. The first three products in the line are: The SX201 parametric EQ/preamp features +15 dB boost and –30 dB notch filter capability, with unbalanced preamp input, balanced/unbalanced line level input, and balanced line driver output. The SX202 dual microphone preamplifier features two ultra-clean microphone preamplifiers with variable gain, 15 dB pad, +48 volt phantom powering, left, right, and left + right outputs. The SX204 is a 1-in, 4-out amplifier utilizing proprietary high voltage converter technology to drive high impedance headphones like a big power amp, while providing more than ample power for low impedance phones.

Mfr. - Symetrix
Price - $239.00 (SX201), $219.00 (SX202), $269.00 (SX204)

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DICTIONARY

• Craig Anderton, well-known industry writer, has announced his new book, "The Electronic Musician's Dictionary." This book gives you clear, concise, plain-English definitions of over 1,000 terms related to musical electronics. There are explanations of complex technical terms as well as many slang expressions that are currently used in this field. If you want to know the meaning of DIP, FET, or SIP, as well as the term "zipper noise," you will find them and a good deal more in this book.

Contact- Music Sales Corp.
Price- $9.95

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RACK STAND

• The Music People, Inc. of West Hartford, CT announces its introduction of the KS 9000 rack stand. It is a high quality, rackmount equipment stand constructed of heavy-duty black anodized, rectangular steel tubing. Partially enclosed ball casters that swivel are made of high-impact, polycarbonate and allow easy movement. These casters have locks if a completely stationary stand is preferred. Its frame supports are notched for convenient angle adjustment. The stand is 30 inches high and holds six double racks or 12 singles, or any combination thereof. All drilled holes are of standard rackmount thread size.

Mfr.- The Music People, Inc.
Price- $114.25

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Classified

FOR SALE

WANTED PULTEC EQ'S. We will pay $1000.00 for almost any Pultec EQP equalizer. Dan Alexander Audio buys, sells and trades all kinds of second hand professional audio equipment. **DAN ALEX-ANDER AUDIO, 2944 San Pablo Ave., Berkeley, CA 94702. (415) 644-2363. Tlx: 650 291 8567 MCI.**

VINTAGE TAPE RECORDERS: 2 Ampex 401A F/T, 1 portable, 1 console, $50.-each; 1 Presto 800 Series, F/T, rack $75. Also, 1 Infonics RCD-2 cassette duplicator (4 cassettes in 2 min.) $250. All manuals. Audio tape, reels/boxes 7"/5". **(201) 836-0194.**

Closing date is the first of the second month preceding the date of issue.

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Quantity discounts are: 3X – 15%; 6X – 30%.

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People, Places... & Happenings

- The Magnetic Tape Division of Agfa-Gevaert, Inc., Ridgefield Park, NJ, announced the recent promotion of Joseph E. Tibensky to the position of National Marketing Manager for Audio Products. He will be responsible for the marketing of the division's line of audio products in the U.S.

- Trident Audio Developments Ltd. have announced the sale of the company to Relyon Group PLC, a publicly traded British company. After more than sixteen years as directors of Trident Audio Developments Ltd., Malcolm Toft and Jack Hartfield have sold their entire interest in the company. Toft explained that their backing has been growing and they needed a large capital commitment. While Toft and Hartfield will remain as active consultants, Relyon has selected Bud Brimberg as Managing Director. Wayne Freeman has accepted the position as Director of International Sales and Marketing for Trident (UK).

- Barbara Flyntz-Bradley is joining VCA Teletronics as the company's newest Audio Mixer, and will be working in VCA's totally redesigned audio suite. Flyntz-Bradley comes to VCA Teletronics from NEP Productions, where she served as Audio Mixer from 1985 to 1988. She had previously spent five years at Regent Sound Studios.

- QSC Audio Products has announced two new appointments at their Costa Mesa, CA headquarters. Tom Day has been promoted to Service Manager, and Neil Pedinoff has joined QSC as a Senior Engineer. Day has been with QSC for over five years and most recently held the position of Manufacturing Engineering Manager. Pedinoff joins QSC after three years at UREI as a Project Engineer.

- Applied Research & Technology, Inc. of Rochester, NY, has appointed Jim Bonis as National Sales and Marketing Manager. According to Phil Betette, ART President, Bonis has been involved in many recent ad campaigns, and is using his new approach with a line-up of new products.

- Studer Revox America, Inc. has named Tore B. Nordahl Vice President and General Manager in charge of operations. The decision was made public on September 12, 1988 by Bruno Hochstrasser, President of SRA in Regensdorf, Switzerland. Nordahl comes to SRA from Mitsubishi Pro Audio Group where he had been president and CEO until this year.

- Peavey Electronics has opened a large new production facility—Meridian Plant #10. This new facility more than doubles Peavey's power amplifier production capabilities, and eventual expansion using streamlined automated technology is aimed at quadrupling the total power amplifier output. All of the quality testing is now performed at highly sophisticated computerized diagnostic work stations. The architectural styling was originated by Peavey Electronics' Vice President Melia Peavey.

On June 25th, at the NAMM awards banquet in Atlanta, Georgia, Hartley Peavey was inducted into the NAMM Hall of Fame. This award was presented by NAMM president Don Griffin on behalf of the association in recognition of the long commitment, outstanding achievements and leadership made by Hartley to the music industry.

- Bill Dooley has been named Director, Audio Engineering at the Los Angeles Record Plant, as announced by Chris Stone, president. Prior to his new position, Dooley was assistant studio manager of A&M Recording Studios and previously served as chief recording engineer at Atlantic Recording Studios in New York City. Dooley will be supervising all aspects of engineering at Record Plant.

- Precision Monolithics Inc. has appointed Ron N. Dow as Staff Director of Design Engineering reporting to Donn Soderquist, VP of New Product Development and Marketing. This appointment comes as the result of PMI's recent acquisition of its new audio product line.

- Harris Corporation announced that it has agreed to acquire the radio equipment distribution business of Allied Broadcast Equipment Corporation of Richmond, Indiana. The acquired business will operate as a new subsidiary of Harris Corporation, and will be part of Harris' Communications Sector, which is headed by senior vice president and sector executive, Guy W. Numann. Allied founder and CEO, Roy M. Ridge, will continue as head of the acquired business.

- Tommy Mottola, President, CBS Records Division, had announced the formation of a West Coast based label to be known as WTG Records. Jerry Greenberg has been named Senior Vice President and General Manager of Operations, heading the label. WTG Records will become one of six wholly owned labels under the CBS Records Division, the domestic arm of CBS Records, Inc.

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